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Fact Book

1985

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Naval Research Laboratory
Washington, D.C.

This document has been prepared as a reference source of factual information about the Naval Research Laboratory. Unless otherwise indicated, this information is current as of 1 April 1985.

The Naval Research Laboratory has a continuing need for physical scientists, mathematicians, engineers, and support personnel. Vacancies are filled without regard to age, race, creed, color, sex, or national origin. Information concerning current vacancies will be furnished upon request. Address all such inquiries to:

Civilian Personnel Office (Code 1800)
Naval Research Laboratory
Washington, DC 20375-5000

COVER: Thomas Edison, the great American inventor, played a major role in the establishment of the Naval Research Laboratory. For this, he has been given a place of honor at the main entrance to the Laboratory. Edison's bust, a gift to NRL from the Edison Foundation, was unveiled by his son, Charles Edison, on December 3, 1952.

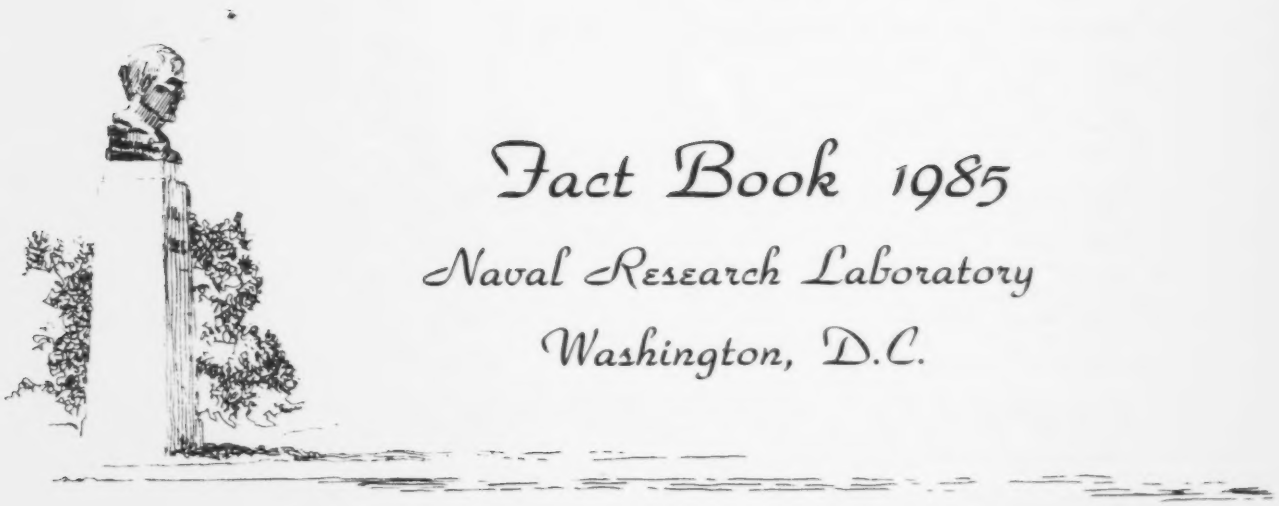
In an interview published May 13, 1915 in the *New York Times Magazine*, Edison declared, "I believe (that)...the Government should maintain a great research laboratory, jointly under military and naval and civilian control. ... In this could be developed the continually increasing possibilities of...all the technique of military and naval progression without any vast expense."

This ultimately led to the dedication on July 22, 1923, of the Naval Experimental and Research Laboratory. The name was shortened to the Naval Research Laboratory in 1926.

REVIEWED AND APPROVED
April 1985

J.P. O'Donovan

CAPT J.P. O'Donovan, USN
Commanding Officer



Fact Book 1985

Naval Research Laboratory

Washington, D.C.

CONTENTS

INTRODUCTION TO THE NAVAL RESEARCH LABORATORY 1
Mission 3
The Naval Research Laboratory 5
Current Research 6
Technical Output 7
Personnel 8
Major Capabilities and Facilities 9
Major NRL Sites and Facilities 12
Fiscal Information 13

EXECUTIVE DIRECTORATE 19
Commanding Officer, Director of Research 23
Deputy Equal Employment Opportunity Officer 23
Public Affairs Officer 25
Scientific Consultant to the Director of Research 26
Office of Management and Administration 27
Operations, Security, and Contracts Division 28
Financial Management Division 30
Civilian Personnel Division 32

TECHNICAL SERVICES DIRECTORATE 37
Office of Patent Counsel 40
Safety Office 40
Administrative Services Office 41
Management Information Systems Staff 41
Engineering Services Division 42
Supply Division 44
Public Works Division 46
Technical Information Division 48
Chesapeake Bay Detachment 50
Research Computation Division 52

GENERAL SCIENCE AND TECHNOLOGY DIRECTORATE 55
Space Science Division 58
Plasma Physics Division 60
Laboratory for Computational Physics 62

SYSTEMS RESEARCH AND TECHNOLOGY DIRECTORATE 65
Acoustics Division 68
Radar Division 70
Tactical Electronic Warfare Division 72
Marine Technology Division 74
Underwater Sound Reference Detachment 76

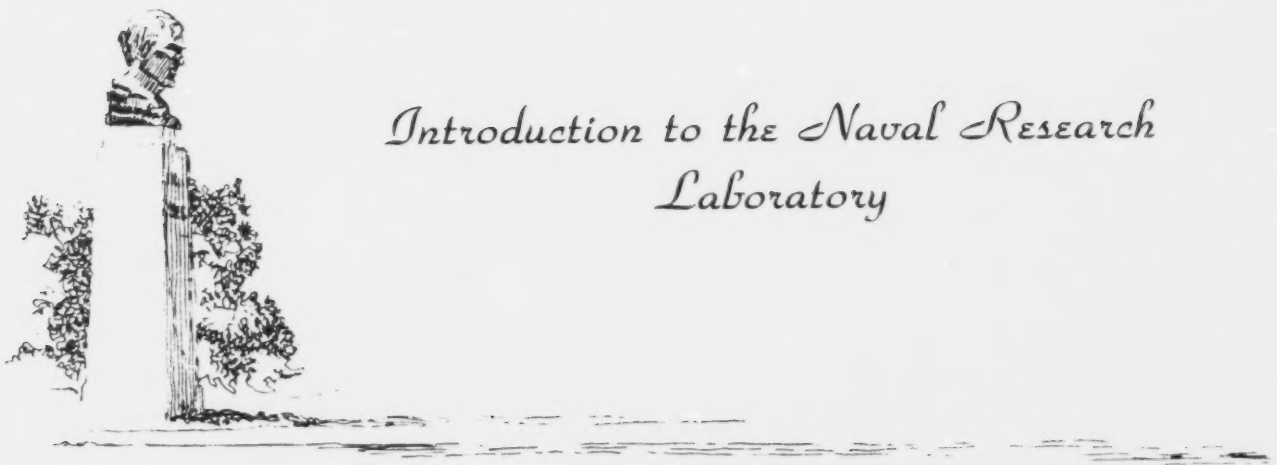
MATERIAL SCIENCE AND COMPONENT TECHNOLOGY DIRECTORATE 81
Laboratory for Structure of Matter 84
Health Physics Staff 85
Chemistry Division 86
Material Science and Technology Division 88
Optical Sciences Division 90
Condensed Matter and Radiation Sciences Division 92
Electronics Technology Division 94

SPACE AND COMMUNICATIONS TECHNOLOGY DIRECTORATE 99
Information Technology Division 102
Space Systems and Technology Division 104

PROFESSIONAL DEVELOPMENT 109

Awards Received by Civilian Employees in FY 1984 114

GENERAL INFORMATION 117
Location of NRL in the Capital Area 117
Location of Buildings at Main Site 118
Location of Principal Field Stations 119
Key Personnel 120



Introduction to the Naval Research Laboratory

READEX

Mission

The mission of the Naval Research Laboratory is to conduct a broadly based, multidisciplinary program of scientific research and advanced technological development directed toward new and improved materials, equipment, techniques, systems, and related operational procedures for the Navy. In fulfillment of this mission, the Naval Research Laboratory:

- Initiates and conducts scientific research of a basic and long-range nature in scientific areas of special interest to the Navy.

- Conducts exploratory and advanced technological development deriving from or appropriate to the scientific program areas.

- Within areas of technological expertise, develops prototype systems applicable to specific projects.

- Performs scientific research and development for other naval commands and, where specially qualified, for other agencies of the Department of Defense and, in defense-related efforts, for other Government agencies.

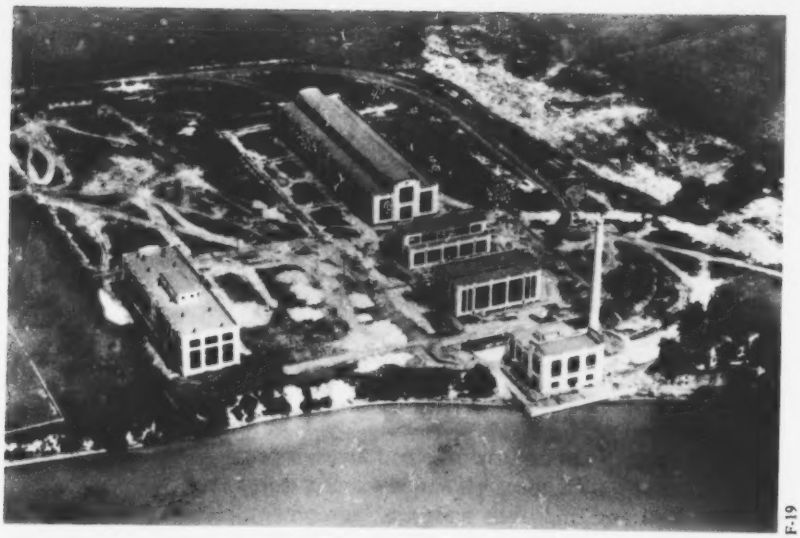
- Upon request from appropriate naval commands, assumes responsibility as the Navy's principal R&D center in areas of unique professional competence.

- Serves as the principal activity for the Navy and its contractors in providing accurate calibration, test, and evaluation services on acoustic transducers and materials; in providing a service whereby an inventory of calibrated standard acoustic transducers is maintained for issue; and in performing research and development to advance the state-of-the-art of acoustic measurements and standard transducers.

- Performs research and development on sonar transducers and related acoustic materials.

- Furnishes scientific consultative services for the Navy and, where specially qualified, for other agencies of the Department of Defense and, in defense-related efforts, for other Government agencies.

- Provides to the Navy determinations of performance characteristics of developmental and prototype devices through limited engineering test and evaluation services.



F-19

Yesterday

F-134

Today

F-30

Proposed Tomorrow

The Naval Research Laboratory

The Naval Research Laboratory (NRL) was officially dedicated on July 2, 1923, as the Naval Experimental and Research Laboratory. In the following six decades, research efforts have expanded from the two original areas of radio and underwater sound to more than 10 broad areas, encompassing such diverse fields as artificial intelligence and fiber optics.

NRL still occupies its original site on the banks of the Potomac River in the southwest corner of Washington, D.C., but the numbers of buildings has expanded from the original 5 buildings to more than 150. The main laboratory site has expanded from 27.5 acres (11 hectares) to 129 acres (51.6 hectares). More than 20 fields sites of varying sizes are used by NRL scientists in pursuit of new knowledge for the Navy and the nation. The original group of about 20 employees has expanded to more than 3200.

For some time, NRL's management has been concerned about the unsuitable condition of many of the Laboratory's older buildings. Many of these buildings were constructed as temporary structures during World War II and have far surpassed their useful lifetime. The remaining older buildings were constructed anywhere from 40 to 60 years ago, and like the "temporaries," do not meet modern research standards. Because of the detrimental effect these facility-related problems can have on NRL's research program, the Laboratory is actively pursuing an extensive facilities improvement plan called Operation Update.

During 1984, an in-depth, programmatic survey of NRL's current research facility requirements and those of the foreseeable future was completed. In addition to this survey, a physical inspection of all NRL research facilities, both old and new, was also completed. At their conclusion, a series of reports were generated to reflect the facilities-related data obtained. These reports, in turn, were used to develop the NRL Corporate Facilities Investment Plan (CFIP).

The CFIP provides the necessary information and detailed plans for a sequence of updating and construction that will permit NRL to move into the 21st century continuing to perform—in the future as in the past—the modern research that is so vital to the development of advanced systems and equipment for the Fleet.

CURRENT RESEARCH

The following areas represent broad fields of NRL research. Under each, more specific topics that are being investigated for the benefit of the Navy and other sponsoring organizations are listed. Some details of this work are given in the *NRL Review*, published annually. More specific details are published in reports on individual projects provided to sponsors and/or presented as papers for professional societies or their journals.

Computer Science and Artificial Intelligence
- Standard Computer Hardware, Development Environments, Operating Systems, and Runtime Support Software
- Methods of Specifying, Developing, Documenting, and Maintaining Software
- Techniques for Naval Needs

Device Technology
- Bio/Molecular Engineering
- Integrated Optics
- Radiation-Hardened Electronics
- Microelectronics
- MM Wave Technology
- Hydrogen Masers for GPS

Directed Energy Technology
- High-Energy Lasers
- Chemical Lasers
- Laser Propagation
- High-Power Microwave Sources
- Charged-Particle Devices

Electronic Warfare
- Decoys (RF and IR)
- Repeaters/Jammers, EO/IR Active Countermeasures
- EW/C^3CM System Concepts

Enhanced Maintainability, Reliability, and Survivability Technology
- Coatings
- Lubricants and Greases
- Water Additives and Cleaners
- Fire Safety
- Laser Hardening
- Satellite Survivability

Environmental Effects on Naval Systems
- Meteorological Effects on Electrooptical System Performance
- Air Quality in Confined Spaces
- Electromagnetic Background in Space
- Solar Activity
- Ionospheric Behavior

Information Management
- Antijam Communication Links
- Network Architectures
- Combat Management Information Systems

Materials
- Material Processing
- Advanced Alloy Systems
- Rapid Solidification Technology
- High-Temperature Materials
- Laser Fabrication and Processing
- Ceramics and Composite Materials

Space Systems and Technology
- Advanced Space Systems
- Space Sensing Applications
- Satellite Communications
- Spacecraft Design, Engineering, and Integration
- Satellite Ground Station Design
- Navigation Systems

Surveillance and Sensor Technology
- Imaging Radars
- Target Classification/Identification
- Towed Acoustic Arrays
- Underwater Acoustic Propagation
- Electromagnetic Sensors-Gamma Ray to RF Wavelengths
- SQUID for Magnetic Field Detection
- Low Observables Technology

Undersea Technology
- Autonomous Vehicles
- Bathymetric Technology
- Anechoic Coatings

TECHNICAL OUTPUT

Patents

During the 61 years of its existence, NRL has made significant discoveries in radio, radar, sonar, atomic theory, space exploration, environmental research, and many other disciplines of vital interest to the Navy. This is exemplified in the granting, in August 1984, of the 3000th patent issued to NRL researchers. A substantial number of the inventions described in these 3000 patents have been incorporated into the Fleet. These patents ensure Navy control over, and free use of, the technology which it develops.

During fiscal year 1984, NRL was granted 46 patents; since its founding, 3007 patents have been granted.

Publications

The results of research conducted at NRL are disseminated in many ways. The primary means of informing the scientific community, as well as the general population, of the work on projects pursued here is through publication. This results in journal articles, reports, conference proceedings and presentations. During fiscal year 1984, NRL researchers were authors of 528 journal articles, 400 NRL reports (both conclusive NRL Formal Reports and NRL Memorandum Reports which describe preliminary research results), and 249 conference proceedings; 1220 presentations were made to scientific and military audiences.

Personnel*

Full-Time Civilians

Senior Executive Service		27
Classification Act (GM/GS)		2554
Scientific and Professional	1360	
Technical Support	470	
General Administrative & Clerical	724	
Federal Wage System		427
Wage Grade (WG)	367	
Apprentices (WT)	10	
Supervisory Wage Grade (WS)	31	
Supervisory Planners & Estimators (WN)	1	
Planners, Estimators, etc. (WD)	17	
Leaders (WL)	1	
Total		3008

Military Personnel Attached to NRL

Officers	Authorized	On Board
Captain	3	3
Commander	8	6
Lieutenant Commander	9	9
Lieutenant	14	17
Lieutenant (Junior Grade)	2	1
Ensign	0	0
Warrant Officer	3	0
Total	39	36
Enlisted	106	102

Annual Civilian Turnover Rate (percent)

	1980	1981	1982	1983	1984
Research divisions	13.5	8.0	7.22	7.65	7.54
Nonresearch areas	11.3	10.9	8.25	11.70	16.15
Entire Laboratory	12.2	9.1	7.63	9.21	10.80

Highest Academic Degrees Held by Permanent Employees

Bachelors	520
Masters	328
Doctorates	679

*As of 30 Sept. 1984

Major Capabilities and Facilities

(Listed alphabetically by organizational unit)

Acoustics Division

- Large tank instrumented for investigating acoustic echo characteristics of targets
- Tank 9.1 m (30 ft) in diameter by 6.7 m (22 ft) deep, automated with computer control and analysis for detailed studies of acoustic fields, for transducers and other underwater devices
- Multichannel Programmable Digital Data Processing System: a system of DEC computers, high-speed array processors, and peripherals for up to 256 channels; designed for acoustic surveillance array processing

Chemistry Division

- Bio/Molecular Engineering Facility
- Submicron Analytical Facility
- Langmuir Blodgett Film Facility
- Chemical Diagnostic Facility
- Surface Diagnostic Facility
- Tribology Facility
- Paint and Coating Facility
- Mechanical and Chemical Characterization of Polymers Facility
- Surface Cleaning Facility
- Alternate and Petroleum-Derived Fuels Facility
- Combustion research facilities
- High-Temperature Chemistry Facility
- Fire research facilities

Chesapeake Bay Detachment (CBD, Chesapeake Beach, MD)

- Radar Experimental Test Site, which includes a variety of radars; ancillary equipment for test and evaluation of equipment, concepts and techniques; and over-water ranges
- Tactical Electronic Warfare Test Site
- Communications facilities for transmission to and from land, sea, and air
- Hypervelocity gun for ballistics research
- Ship Motion Simulator with 11-metric-ton (12-ton) payload capacity
- Fire Test Facility for fire extinguishment research
- Boat services

Condensed Matter and Radiation Sciences Division

- Helium-3 Dilution Refrigerator
- 75-MeV Sector-Focusing Cyclotron
- 60-MeV Linear Electron Accelerator (Linac)
- 5-MV Positive Ion Van de Graaff Accelerator
- Ion Implantation Facility
- 2-MV Electron Van de Graaff Accelerator
- Cobalt-60 source
- Hypervelocity gun ranges

Electronics Technology Division

- Microelectronics Processing Facility
- Electron beam lithography system
- Electron microscopes and electrooptical analytical devices
- High Resolution Scanning Electron Microscope/Scanning Transmission Electron Microscope
- Crystal-growing facilities including Molecular Beam Epitaxy
- High Magnetic Field Facility
- A variety of electronic testing and analysis facilities

Engineering Services Division

- Mechanical, electronic, and project engineering and design
- Manual and computer-aided design and drafting
- Printed circuit CAD/CAM facility (REDAC)
- Shops for machining, sheet metal, welding, casting, plating, plastics, printed circuits, electronic assembly, and other fabrication services
- A wide variety of testing and repair capabilities

Health Physics Staff

- X-Ray and Gamma-Ray Calibration Facility

Information Technology Division

- Microwave Space Research Facility
- HF modem and channel simulation
- Brandywine Antenna Range
- Pomonkey Test Range
- Signal Analysis Laboratory
- Artificial Intelligence Computer Network

Laboratory for Computational Physics

VAX 11/780 plus peripherals, terminals, communications—connected to: NRL Network and MILNET, LANL X Cray and X Net, APTEC DPS + FPS Array Processors
NRL Cray XMP—2M words, digital frontend
DICOMED D-38 Design Station and NRL DICOMED microfilm recorder

Laboratory for Structure of Matter

Two x-ray diffractometers
Electron diffractometer

Marine Technology Division

Computer-aided experimental stress analysis
Shock and Vibration Laboratory
Wave channel: a 30-m channel with fan and mechanical wave-maker instrumented for the study of wave generation and wave effects
Water tunnel: a large blow-down water channel with a 15-m long test section for acoustic and flow-induced vibration studies of towed line arrays and flexible cables
Tow channel: a 20-m dual carriage tow channel with variable stratification for studies of geophysical flows and wakes

Material Science and Technology Division

Ultrasonic gas atomizer
Hot isostatic press
Consumable arc electrode melter for reactive metals
High energy dispersive x-ray analytical system
Electron microprobe SEM and STEM systems
Quantitative metallography
Computer-controlled multiaxial loading & SCC measurement systems
Computer interactive nonlinear multimode fracture measurement system
Crystallite orientation distribution function (CODF)
Impression creep and mechanical property evalution
Automated physical constant measurement system
Closed-loop low and high-cycle fatigue systems

Operational Services

Mobile research platforms: three P3A, one P3B Orion aircraft. Three of the aircraft are especially configured for scientific support. The ASW suites have been removed and the interiors have been converted for research project installations. One aircraft remains in Fleet ASW configuration.

Optical Sciences Division

Electron-beam, electron-beam sustained, and UV preionized laser devices with spectroscopic and other diagnostic equipment
Short-pulse excitation apparatus for kinetic mechanisms investigations
Optical Warfare Laboratory
Mobile, high precision optical tracker
Facilities for synthesis and characterization of optical glass compositions and for the fabrication of optical fibers
Hybrid optical/digital image processing facility
Facilities for fabricating and testing integrated optical devices
Optical probes laboratory to study viscoelastic, structural, and transport properties of molecular systems
Computer IR/EO Technology/Systems Simulation Center
Kilojoule Laser Research Facility
Field qualified EO/IR measurements devices
Beam lines at the National Synchrotron Light Source, Brookhaven, for extensive materials characterization
Focal Plane Array Evaluation Facility

Plasma Physics Division

Gamble I and II High-Voltage Pulsed Power Generators
PHAROS II Two-Beam Neodymium-Glass Laser and Target Facility
1000-J NRL CO_2 Laser
7-MJ Homopolar Generator
High Power Free-Electron Laser and Gyrotron Facilities

Public Works Division

Construction, engineering, repair, and other services to maintain and improve NRL's physical facilities

Radar Division

Radar Cross Section Measurement System
Radar research and development test beds (at CBD)
Versatile C-, X-, and K_a-band monopulse precision tracking radar systems (at CBD)
IFF ground station
Interpretation facility for synthetic aperture radar (SAR)

Airborne APS-116 radar with SAR processing
Recording and control system for airborne adaptive array research
Noncooperative Target Recognition Facility
Antenna Measurement Laboratory
MADRE Over-the-Horizon Radar (at CBD)
Digital Image Processing Laboratory

Research Computation Division

Cray XMP-12 Computer (front ended by three DEC VAX 11/785 computers), an extremely large, high speed, powerful computational system particularly well-suited for scientific and engineering usage
DEC VAX 11/785's (3) Front end to the Cray XMP-12 computer, providing linkages to a wide variety of local NRL computers as well as services to individuals at NRL and elsewhere for scientific and nonscientific uses
NRL Broadband Local Area Network (NICENET) that connects most NRL buildings for computer and other communications and provides gateways to nation-wide communications/computer capabilities
Off-line graphics capability via TID's DICOMED
CALCOMP 1055 and 5200 Plotting Facilities
VAX-11/780 MIS Computers (2)
DEC-10 MIS Computer
VAX-11/750 Milnet Connection

Space Science Division

Waldorf Annex (lower site). This facility is instrumented for continuous recordings of atmospheric-electricity. micrometeorologic, and lightning-flash data, and is utilized for numerous investigations into environmental phenomena
Instrumented micrometeorological tower on San Nicolas Island, CA
Ionospheric sensing and propagation analysis
26-m (85-ft) radio telescope at Maryland Pt., Md.
Other antennas for radio astronomy
E.O. Hulburt Center for Space Research
Development and test facilities for space-borne instruments to perform astrophysical, solar, high atmospheric, and space environment sensing
Clean-room facilities
Extensive computer-assisted data manipulation and interpretive capability for space-data imaging and modeling
Continuous solar coronal monitoring (from the STP P78-1 Observatory)

Space Systems and Technology Division

CAD/CAM Facility
Anechoic chambers
Thermal vacuum chambers
Spin Balance Facility
Acoustics Facility
Vibration Facility
Clean-room facilities
Satellite tracking facilities
30.5-m (100-ft) wave tank for studying dynamics of wind waves and their interactions with long waves; uses microwave Doppler spectrometry and optical and photometric techniques
Free Space Antenna Range (Pomonkey, Md.)

Supply Division

Acquisition, storage, distribution, and disposal of materials and equipment required by the Research Directorates

Tactical Electronic Warfare Division

Mobile Infrared Signature Measurement and Simulation Facility
Mobile ESM Laboratory
Hybrid RF/IR Missile Seeker Simulation Facility
Central Target Simulation Facility for developing, testing, andnd evaluating EW systems and techniques, using real-time, hardware-in-the-loop models
RF Simulation Laboratory and signal simulators
Radar Cross Section Measurement Facility (at CBD)
Search Radar ECM simulator
Advanced Tactical EW Environment Simulator

Technical Information Division

Editorial, graphic, photographic, and composition, public affairs; technical library; exhibit and presentation support; and computer graphics services

Underwater Sound Reference Detachment (Orlando, FL)

2.8-hectare (7-acre) lake with a large pier and instrumentation for underwater acoustic studies
Anechoic tank for simulating ocean depths up to 700 m (2297 ft)
Smaller pressure vessels for simulating depths to 7000 m (22,966 ft)
Field station at Bugg Spring with floating platform and instrumentation for acoustic measurements

Major NRL Sites and Facilities

Station and Location	Acreage			Buildings and Structures
	Navy Title	Easement or Purchase	Permit or Lease	
District of Columbia				
NRL	129.23		1.29	153
Cyclotron building site, Bolling AFB			5.24	1
Virginia				
Radio research site, Coast Guard Radio Station, Alex.			55.40	
Maryland				
NRL Flight Support Detachment, NAS Patuxent River[1]			—	
Chesapeake Bay Det., Chesapeake Beach[2]	167.90			193
Multiple research site, Tilghman Is.	2.00			13
Dock facility, Fishing Ck., Ches. Bay			0.60	5
NRL Waldorf Annex, Waldorf[2]	23.94	35.16		37
Radio Astronomy Observatory, Md. Pt.	24.30		197.88	13
Radio antenna range, USAF Receiver Site, Brandywine[2]			22.98	
Free Space Antenna Range, Pomonkey[2]	14.12	28.40		13
Satellite tracking facility, Blossom Point			288.0	
Florida				
Underwater Sound Reference Det., Orlando[2]	10.46			32
USRD, Leesburg Facility, Bugg Spring[2]			65.0	9
Totals:	371.95	63.56	636.39	469

[1]Site or equipment used by NRL under an intraservice (Navy) or interservice agreement.
[2]Also included in list of "Major Capabilities and Facilities."

FISCAL INFORMATION

NRL FUNDING BY MAJOR SPONSOR

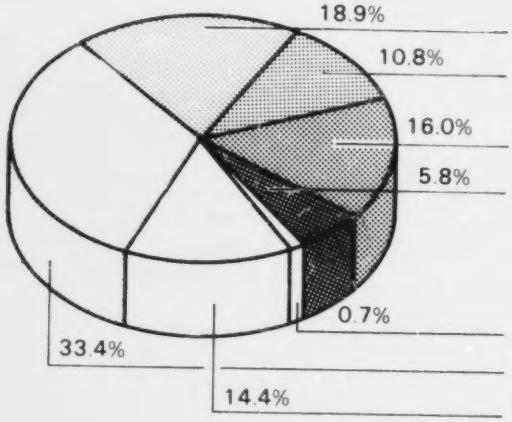
Sponsor	FY 1984 Actual ($M)	FY 1984 Percent	FY 1985 Estimated ($M)	FY 1985 Percent
ONR	70.6	18.9	68.0	17.8
CNM	2.6	0.7	1.5	.4
NAVELEX	59.8	16.0	60.0	15.7
NAVAIR	21.7	5.8	22.2	5.8
NAVSEA	40.4	10.8	32.1	8.4
Other Navy	124.8	33.4	143.3	37.5
Total Navy	319.9	85.6	327.1	85.6
Other DoD	31.8	8.5	34.0	8.9
Non-DoD	22.1	5.9	21.0	5.5
Total Non-Navy	53.9	14.4	55.0	14.4
Total Funding	373.8	100.0	382.1	100.0

DISTRIBUTION OF FUNDS
(FY 1985, Estimated)

	($M)
Direct Labor & Overhead	159.8
Materials*	47.3
Travel	6.1
Contracts	168.9
TOTAL	382.1

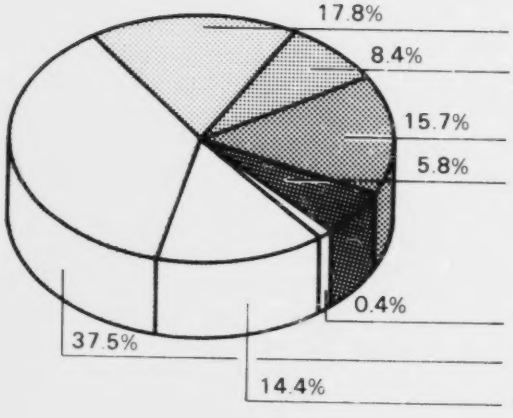
*Also includes Other Costs, such as ADP charges, tuition, etc. These costs are planned to amount to $30.8 million in FY 1985

SOURCES OF FUNDS
FY 1984 (NEW ORDERS RECEIVED)



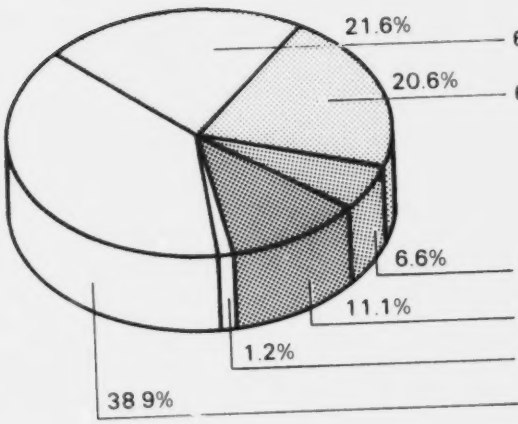
	$M
Office of Naval Research (ONR)	70.6
Naval Sea Systems Command (NAVSEA)	40.4
Naval Electronic Systems Command (NAVELEX)	59.8
Naval Air Systems Command (NAVAIR)	21.7
Chief of Navy Material (CNM)	2.6
Other Navy	124.8
Other	53.9
Actual funding	373.8

FY 1985 PLAN (NEW ORDERS)



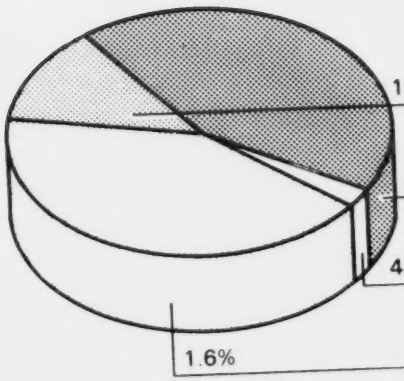
	$M
Office of Naval Research (ONR)	68.0
Naval Sea Systems Command (NAVSEA)	32.1
Naval Electronic Systems Command (NAVELEX)	60.0
Naval Air Systems Command (NAVAIR)	22.2
Chief of Navy Material (CNM)	1.5
Other Navy	143.3
Other	55.0
Planned funding	382.1

RDT&E NAVY FUNDS BY CATEGORY
FY 1985 PLAN (NEW ORDERS)



	($M)
6.1 Research	64.3
6.2 Exploratory Development	61.5
6.3 Advanced Development	19.5
6.4 Engineering Development	33.2
6.5 Management and Support	3.5
6.6 Operational Systems Development	116.0
Total	298.0

DISTRIBUTION OF FUNDS
FY 1985 PLAN



	($M)
Material*	47.3
Direct labor and overhead	159.8
Contracts	168.9
Travel	6.1
Total	382.1

*Also includes other costs, such as ADP charges, tuition, etc. These cost are planned to amount to $30.8 million in FY 1985

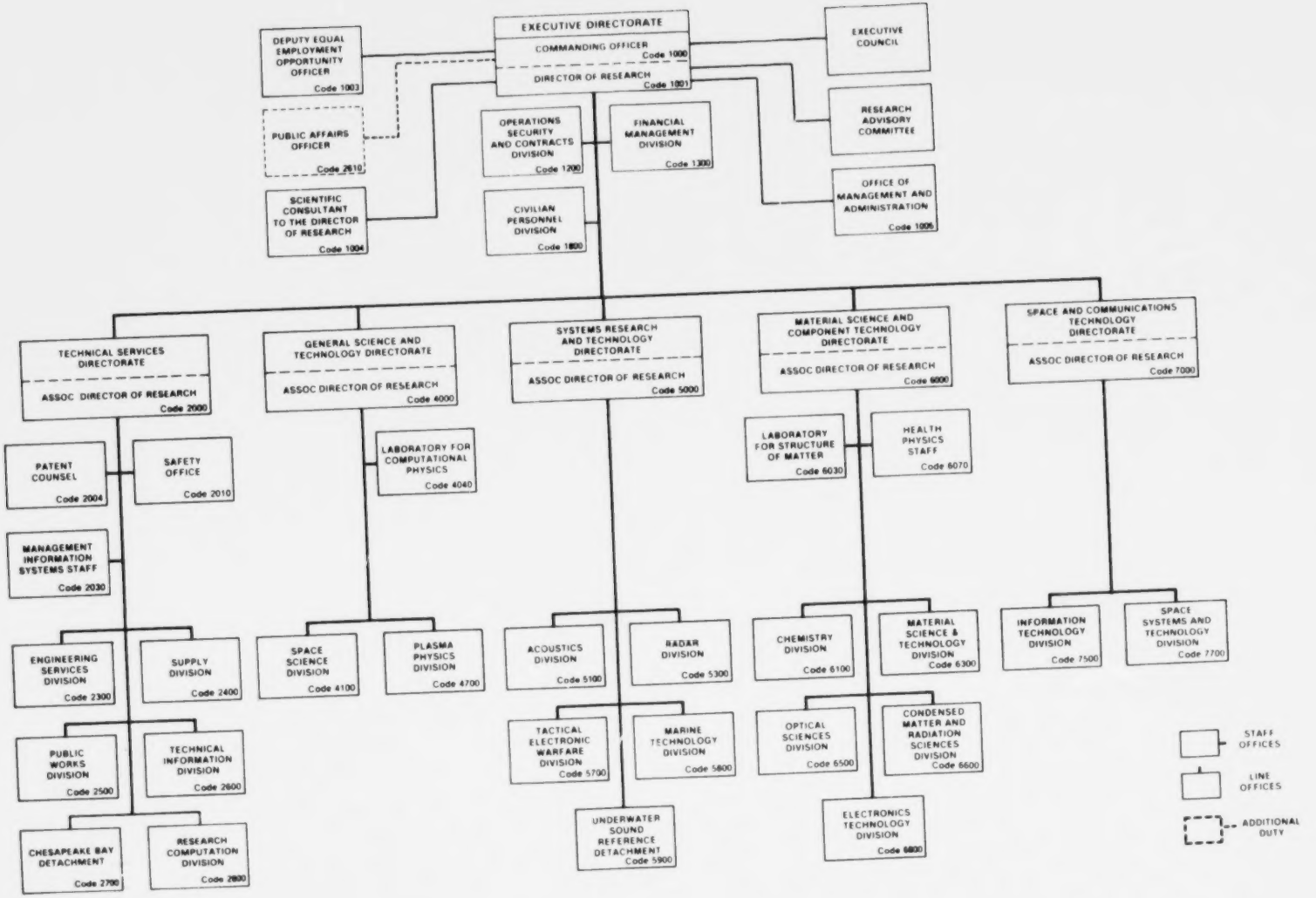
R&D PROGRAM FUNDS BY TYPE

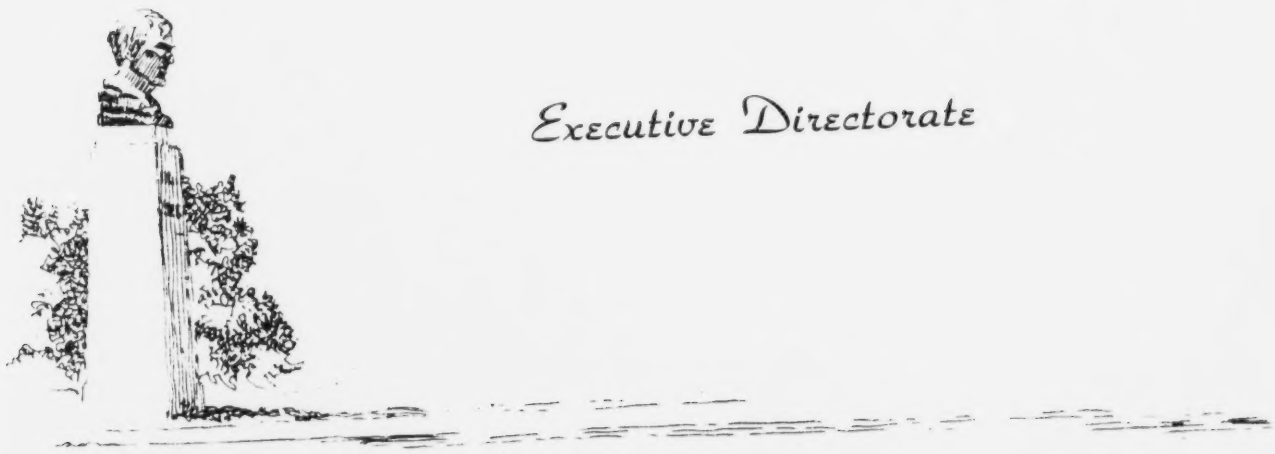
Type or Purpose of Funds	FY 1984 Actual ($M)	FY 1984 Percent	FY 1985 Planned ($M)	FY 1985 Percent
Research, Development, Test and Evaluation, Navy				
6.1 Research	$62.9	16.8	$64.3	16.8
6.2 Exploratory Development	60.2	16.1	61.5	16.1
6.3 Advanced Development	26.9	7.2	19.5	7.2
6.4 Engineering Development	32.5	8.7	33.2	8.7
6.5 Management & Support	3.4	0.9	3.5	.9
6.6 Operational Systems Development	105.7	28.3	116.0	28.3
RDT&E Navy Subtotal	291.6	78.0	298.0	78.0
Other RDT&E Subtotal	46.7	12.5	47.8	12.5
Total RDT&E	338.3	90.5	345.8	90.5
Other procurement, Navy	2.7	.7	2.8	.7
Operation and Maintenance, Navy	10.1	2.7	10.3	2.7
Other	22.7	6.1	23.2	6.1
Total	373.8	100.0	382.1	100.0

CAPITAL PROPERTY

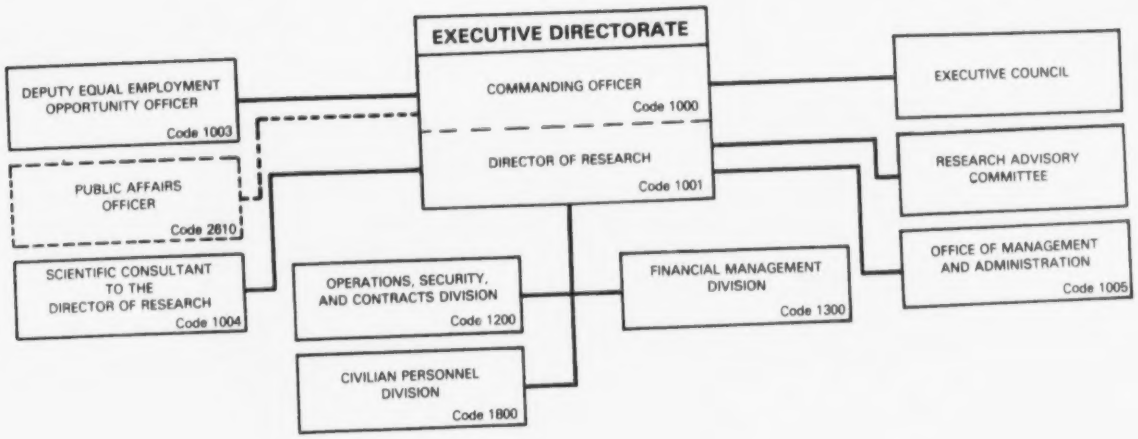
	Acquisition Value (30 Sept 1984, $K)
Class 1 (Land)	353
Class 2 (Buildings and improvements)	100,953
Class 3 (Equipment over $1.0 K)	81,570
Class 4 (Industrial production equipment)	15,131
Class 5 (Minor property)	9,694
Class 0 (Sponsor-owned equipment)	29,907
Total Capital Property	237,608

NAVAL RESEARCH LABORATORY


EXECUTIVE DIRECTORATE
COMMANDING OFFICER Code 1000
DIRECTOR OF RESEARCH Code 1001
DEPUTY EQUAL EMPLOYMENT OPPORTUNITY OFFICER Code 1003
PUBLIC AFFAIRS OFFICER Code 2610
SCIENTIFIC CONSULTANT TO THE DIRECTOR OF RESEARCH Code 1004
EXECUTIVE COUNCIL
RESEARCH ADVISORY COMMITTEE
OFFICE OF MANAGEMENT AND ADMINISTRATION Code 1006
OPERATIONS SECURITY AND CONTRACTS DIVISION Code 1200
FINANCIAL MANAGEMENT DIVISION Code 1300
CIVILIAN PERSONNEL DIVISION Code 1800
TECHNICAL SERVICES DIRECTORATE
ASSOC DIRECTOR OF RESEARCH Code 2000
PATENT COUNSEL Code 2004
SAFETY OFFICE Code 2010
MANAGEMENT INFORMATION SYSTEMS STAFF Code 2030
ENGINEERING SERVICES DIVISION Code 2300
SUPPLY DIVISION Code 2400
PUBLIC WORKS DIVISION Code 2500
TECHNICAL INFORMATION DIVISION Code 2600
CHESAPEAKE BAY DETACHMENT Code 2700
RESEARCH COMPUTATION DIVISION Code 2800
GENERAL SCIENCE AND TECHNOLOGY DIRECTORATE
ASSOC DIRECTOR OF RESEARCH Code 4000
LABORATORY FOR COMPUTATIONAL PHYSICS Code 4040
SPACE SCIENCE DIVISION Code 4100
PLASMA PHYSICS DIVISION Code 4700
SYSTEMS RESEARCH AND TECHNOLOGY DIRECTORATE
ASSOC DIRECTOR OF RESEARCH Code 5000
ACOUSTICS DIVISION Code 5100
RADAR DIVISION Code 5300
TACTICAL ELECTRONIC WARFARE DIVISION Code 5700
MARINE TECHNOLOGY DIVISION Code 5800
UNDERWATER SOUND REFERENCE DETACHMENT Code 5900
MATERIAL SCIENCE AND COMPONENT TECHNOLOGY DIRECTORATE
ASSOC DIRECTOR OF RESEARCH Code 6000
LABORATORY FOR STRUCTURE OF MATTER Code 6030
HEALTH PHYSICS STAFF Code 6070
CHEMISTRY DIVISION Code 6100
MATERIAL SCIENCE & TECHNOLOGY DIVISION Code 6300
OPTICAL SCIENCES DIVISION Code 6500
CONDENSED MATTER AND RADIATION SCIENCES DIVISION Code 6600
ELECTRONICS TECHNOLOGY DIVISION Code 6800
SPACE AND COMMUNICATIONS TECHNOLOGY DIRECTORATE
ASSOC DIRECTOR OF RESEARCH Code 7000
INFORMATION TECHNOLOGY DIVISION Code 7500
SPACE SYSTEMS AND TECHNOLOGY DIVISION Code 7700
STAFF OFFICES
LINE OFFICES
ADDITIONAL DUTY



Executive Directorate



Key Personnel

Name	Title	Code
CAPT J.P. O'Donovan, USN	Commanding Officer	1000
Dr. T. Coffey	Director of Research	1001
Ms. Sol del Ande Eaton	Dep. Eq. Empl. Op. Officer	1003
Mr. J.W. Gately, Jr.	Public Affairs Officer	2610
Dr. A.H. Aitken	Scientific Consultant to Director of Research	1004
Mrs. M. Oliver	Head, Office of Management and Administration	1005
CAPT J. B. Morris, USN	Chief Staff Officer	1200
Mr. R.W. Steinbeck	Comptroller	1300
Mr. D.J. Blome	Head, Civilian Personnel Division	1800
Mr. J.D. Brown	Associate Director of Research for Technical Services	2000
Dr. W.R. Ellis	Associate Director of Research for General Science and Technology	4000
Mr. R.R. Rojas	Associate Director of Research for Systems Research and Technology	5000
Dr. A.I. Schindler	Associate Director of Research for Material Science and Component Technology	6000
Dr. B. Wald	Associate Director of Research for Space and Communications Technology	7000

Executive Directorate

F-18(A)

The Commanding Officer and the Director of Research share executive responsibility for the management of the Naval Research Laboratory; however, in accordance with Navy requirements, the Commanding Officer is responsible for the overall management of the Laboratory and exercises the usual functions of command including compliance with legal and regulatory requirements, liaison with other military activities, as well as the general supervision of the quality, timeliness, and effectiveness of the technical work and of the support services.

The Commanding Officer delegates line authority and assigns responsibility to the Director of Research for the technical program, its planning, conduct, and staffing; evaluation of the technical competence of personnel; liaison with the scientific community; selection of subordinate technical personnel; exchange of technical information; and the effectiveness of the NRL mission.

Within the limits of Navy requirements, the Commanding Officer and the Director of Research share authority and responsibility for the internal management of the Laboratory. The Commanding Officer retains all authority and responsibility specifically assigned to him by higher authority.

The mission of the Laboratory is carried out by the four science and technology directorates supported by the Technical Services Directorate and the Executive Directorate. In addition, the Laboratory's operating staffs provide assistance in their special fields to the Commanding Officer and the Director of Research. The operating staffs are listed on the following pages of this publication.

Commanding Officer

Captain James P. O'Donovan, USN, was born in Newburgh, N.Y. on February 11, 1935. He attended Manhattan College in New York City, graduating in June 1956 with a bachelor's degree in electrical engineering. He was commissioned as an ensign from Officers' Candidate School in December 1956.

Upon completion of successive engineering assignments at the U.S. Naval Mine Defense Laboratory and as the Bureau of Ships Technical Representative to the IBM Corporation, he was ordered to the Naval Postgraduate School, where he earned a master of science degree in electronics engineering in 1962. Duty tours aboard the HORNET (CVS-12) as Electronics Officer and at the Long Beach Naval Shipyard in Design, Combat Systems and Repair Department assignments preceded rotation in July 1967 to the newly established Naval Ship Engineering Center for duty as Assistant Naval Tactical Data Systems Project Officer. Promoted to commander in July 1970, he became Fleet Electronics Material Officer on the Staff of Commander Service Force, U.S. Pacific Fleet, in August 1971, with additional duty assigned in this capacity on the Staff, Commander-in-Chief, U.S. Pacific Fleet.

He was selected for promotion to captain in June 1977, while serving as the Director of Telecommunications in the Office of the Assistant Secretary of the Navy (Manpower, Reserve Affairs and Logistics).

In August 1977, Captain O'Donovan assumed command of the Naval Electronic Systems Engineering Center, Charleston, S.C., and remained in command for 30 months. He reported to the Naval Sea Systems Command in February 1980, as Program Manager, Navy Shipboard Embedded Computer Systems.

Captain O'Donovan's awards and service medals include the Meritorious Service Medal (two awards), the Navy Commendation Medal (two awards), the Navy Unit Commendation, the National Defense Medal with one star, and the Vietnam Service Medal with one star. Captain O'Donovan graduated from the Industrial College of the Armed Forces in 1976 and earned a master of science degree in Administration from George Washington University in September 1976. He is a member of the American Society of Naval Engineers.

Director of Research

Dr. Timothy Coffey was born in Washington, D.C. on June 27, 1941. He graduated from the Massachusetts Institute of Technology in 1962, with a B.S. degree in electrical engineering, and obtained his M.S. (1963) and Ph.D. (1967), both in physics, from the University of Michigan.

During his graduate career, Dr. Coffey worked as a research assistant at the University of California (1963-64), a research physicist at the Air Force Cambridge Research Laboratories (1964-65), and a teaching fellow and research assistant in physics at the University of Michigan (1965-66). As a scientific consultant for EG&G, Inc. (1966-71), he was involved in investigations in theoretical and mathematical physics.

Dr. Coffey came to the Naval Research Laboratory in 1971, as Head of the Plasma Dynamics Branch, Plasma Physics Division. In this position, he directed research in the simulation of plasma instabilities, the development of multidimensional fluid and magnetohydrodynamic codes, and the development of computer codes for treating chemically reactive flows. In 1975, he was named Superintendent, Plasma Physics Division; he was appointed Associate Director of Research for General Science and Technology on January 1, 1980. On November 28, 1982, he was named Director of Research.

Dr. Coffey is recognized as an authority on the theory of nonlinear oscillations and has played a major role in the national program on high-altitude nuclear effects. The author or co-author of over 70 publications and reports, he has made several fundamental contributions to the theory of electron beam-plasma interaction and to the understanding of plasma processes in the earth's ionosphere.

Dr. Coffey is a fellow of the American Physical Society, a fellow of the Washington Academy of Sciences, and a member of Sigma Xi. Among Dr. Coffey's recent honors and awards are the Senior Executive Service Performance Award and the Rear Admiral William S. Parsons Award for Scientific and Technical Progress (honorable mention). In 1981, he was awarded the Presidential Rank of Meritorious Executive.

Deputy Equal Employment Opportunity Officer

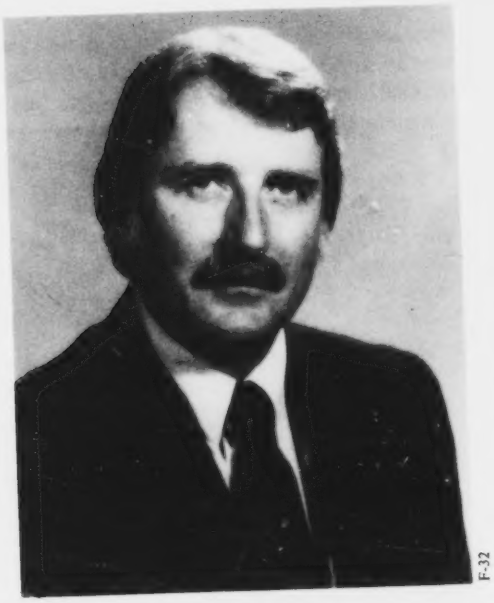
Ms. Sol del Ande Eaton

Basic Responsibilities

The Deputy Equal Employment Opportunity Officer serves as the personal representative of the Commanding Officer of the Naval Research Laboratory. As such, the Deputy is responsible for planning, developing, directing, and evaluating the Federal Women's Program, the Hispanic Employment Program, the Handicap Program, and the full implementation of Public Law 92-261, Executive Orders, Department of the Navy directives, and related statutes and orders. The Deputy advises the Commanding Officer and key management officials about employment policies and practices that may be barriers to employment or advancement to applicants or employees, and makes recommendations on effective methods to remove those barriers, so that those whom the laws were designed to protect from discrimination will be able to seek and secure employment, and embark on their career goals on an equitable basis.

The Deputy is the responsible manager for the EEO Program at NRL and the administrator of the complaint processing system. She is responsible for planning and implementing EEO training for supervisors and for conducting surveys and studies relating to NRL's Affirmative Action Program Plan; acts as ex-officio member of the EEO committee and supervises and assists EEO counselors in settling initial complaints of alleged discrimination. Members of the EEO staff include: the Federal Women's Program Manager (FWPM) Gwen VanHoosier, the Handicap/Hispanic Employment Program Manager (H/HEPM) Dinah F. Benveniste-Cohen, and Equal Opportunity Assistant, Gloria Rogers.

Public Affairs Officer



F-32

Mr. J. W. Gately, Jr.

Basic Responsibilities

The Public Affairs Officer (PAO) advises the Commanding Officer and Director of Research on public affairs matters, including external and internal relations; serves as the Commanding Officer's principal assistant in the area of public affairs; and concurrently serves as Head of the Information Services Branch.

To do this, the PAO plans and directs a program of public information dissemination on official NRL activities through the preparation and distribution of printed, visual, and audiovisual materials to the news media and the general public. The PAO coordinates responses to requests from the news media and the public for unclassified information or materials dealing with the Laboratory, coordinates participation in community relations activities, and directs a program of internal information dissemination within the Laboratory.

The Public Affairs Officer is also responsible for coordinating all actions within the Laboratory that respond to requirements of the Freedom of Information Act (FOIA). In this role, the public affairs office is responsible for keeping abreast of modification in the law, implementing DoD and Navy instructions, and ensuring that NRL is in compliance with them; maintaining the official Laboratory file of FOIA actions; conducting required liaison with other government agencies; and responding to periodic report requirements imposed by higher authorities.

Scientific Consultant to the Director of Research

F-33

Dr. A.H. Aitken

Basic Responsibilities

The Scientific Consultant carries out studies and analyses relating to the programs being carried out at the Laboratory on behalf of the Director of Research. He also represents the Laboratory on external technical boards, advisory panels, or working groups as requested by the Director of Research.

Office of Management and Administration

Basic Responsibilities

The Office of Management and Administration provides managerial, technical, and administrative support to the Director of Research in his planning and direction of research and development programs in a variety of scientific and engineering disciplines. Specific functions include: performing special studies involving major NRL programs and resource issues; providing administrative support in the areas of personnel, budget, facilities, equipment, and security; reviewing and managing director of research correspondence; providing management information and analyses for various aspects of the research program effort; coordinating NRL's Technology Transfer Program; coordinating VIP and foreign visits to NRL; managing the NRL Directives System; coordinating unsolicited proposals, congressional correspondence, and other external inquiries; maintaining the NRL R&D Achievements File; reviewing and interpreting external Navy and DoD directives addressed to NRL; managing the Defense Retail Interservice Support Program (Host-Tenant Agreements); coordinating the IR&D Program; developing guidance for and monitoring the 6.1 (basic research) Program; providing central word processing services to the Directorate; coordinating the NRL-NRC and **NAVMAT** Postdoctoral Resident Research Associateship Programs, NRL-US Naval Academy Faculty Coop Program, Navy ASEE Program, and other special Navy programs; interacting with ONR Headquarters and the R&D Centers as laboratory representative; developing NRL's Five-year Plan; and serving as liaison for all contacts with, and inquiries from, OMG, GAO, and other Government audit agencies.

F-171

Mrs. M. Oliver

Key Personnel

Name	Title
Mrs. M.C. Oliver	Head, Office of Management and Administration
Mr. D.J. DeYoung	Special Assistant
Ms. B.J. McDonald	Administrative Assistant
Mr. R. Fulper, Jr.	Head, Technology Transfer and Special Programs Staff
Mr. R.C. Spragg	Head, Management Information Staff
Mrs. B.L. Murphy	Head, Directives Staff

Personnel		R&D Budget	
Full-time civilian:	23	FY 1985:	$1,155,000

Operations, Security, and Contracts Division

- **FLIGHT DETACHMENT**
- **CONTRACT STAFF SERVICES**
- **PERSONNEL AND PHYSICAL SECURITY**
- **PROCUREMENT SERVICES**

F-44

Visitor Control

F-45

Operational Services

F-47

Message Control

F-130

Physical Security

F-87

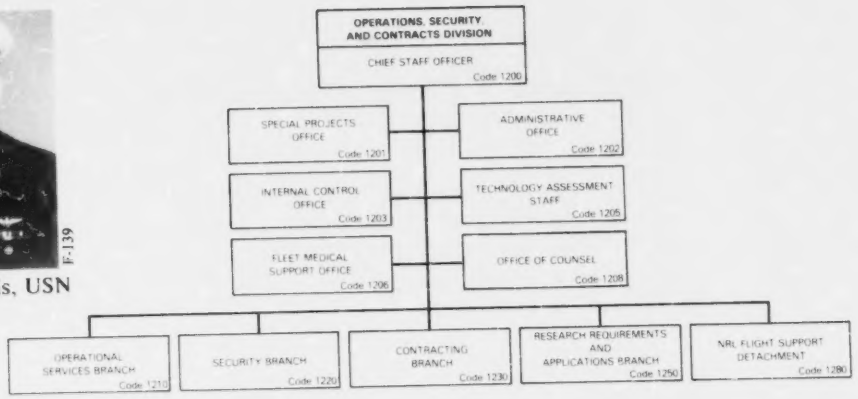
Legal Services

F-46

Contracts

F-139

CAPT J.B. Morris, USN



Basic Responsibilities

The Operations, Security, and Contracts Division is headed by the Chief Staff Officer who serves as the Deputy to the Commanding Officer and acts for the Commanding Officer in his absence. The Chief Staff Officer is the Laboratory's Inspector General, and he coordinates NRL's Research Reserve program.

The Division provides a military staff to the Commanding Officer and to the Director of Research for the purpose of direct research support and assisting in the military aspects of the managment of the Laboratory. The staff is the liaison with DOD, Navy commands/activities, and the operating forces of the Navy. It supports NRL research and development operations and coordinates military applications of the scientific work of the Laboratory. Direct research support is provided through operations of four multiengine Laboratory aircraft. In addition, the staff arranges for air, surface, and subsurface services as required by research and development operations.

The Division is responsible for physical, personnel, communications, information, and ADP security as well as fire protection. It provides intelligence support and support for international cooperative agreements in technology control, compiling and maintaining a comprehensive technical data base which include the Military Critical Technologies List and register of technical experts. It is further responsible for conducting research in medical support for wartime and civilian disaster management planning.

The Division provides the major procurement services which include consultant/advisory contract staff services, as well as administration and monitoring of contract performance. It provides legal counsel and services in the fields of procurement, business and commercial law, civilian personnel law, and government regulations, and laws which affect the Laboratory. The staff also coordinates the Laboratory's internal control program.

Key Personnel

Name	Title
CAPT J.B. Morris, USN	Chief Staff Officer
CAPT F.K. Duffey, USN	Special Projects Coordinator
Ms. M.L. Bond	Administrative Officer
Ms. M.S. Rathbun	Internal Control Officer
Mr. L.M. Winslow	Head, Technology Assessment Staff
Dr. P.B. Richards	Head, Fleet Medical Support Office
Mr. K.E. Nelligan	Legal Counsel
CDR J.P. Kirkendall, USN	Operational Services Officer
Mr. J.R. Gallagher	Communications/Message Center
Mr. M.B. Ferguson	Head, Security Branch
Mr. F. Washington	Head, Classification Management and Control Section
Mr. W.C. Bryan	Head, Special Security Office/Special Activities Office
Mrs. S.A. Cornwell	Head, Personnel and Physical Security Section
Mr. J. Ablard	Head, Contracting Branch
LT J.P. Fagan, Jr. USN	Deputy Head, Contracting Branch
Mr. F.A. Mazzanoble	Head, Contract Section #1
Ms. L.B. Clark	Head, Contract Section #2
Mrs. V.H. Dean	Head, Contract Section #3
CDR T.E. Frazier, USN	Head, Research Requirements and Applications Branch
CDR D.P. Glanzman, USN	Head, OIC, NRL Flight Support Detachment

Personnel

Full-time civilian: 131 Military: 91

Financial Management Division

- GENERAL ACCOUNTING
- COST ACCOUNTING
- SYSTEMS ACCOUNTING
- DISBURSING
- BUDGET

F-21

Payroll

F-28

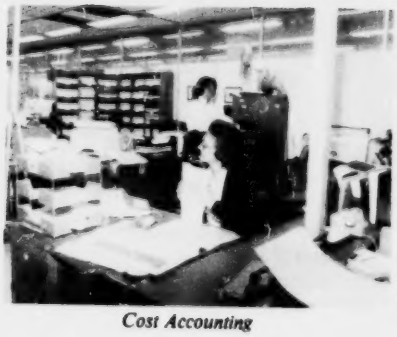
Administrative Support

F-135

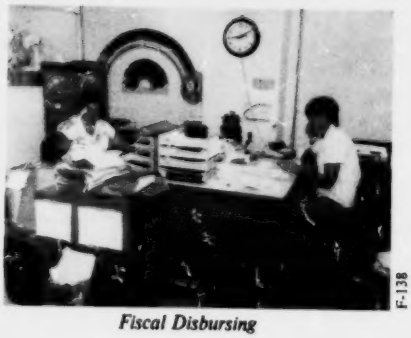
Budget

F-136

Travel Disbursing


F-137

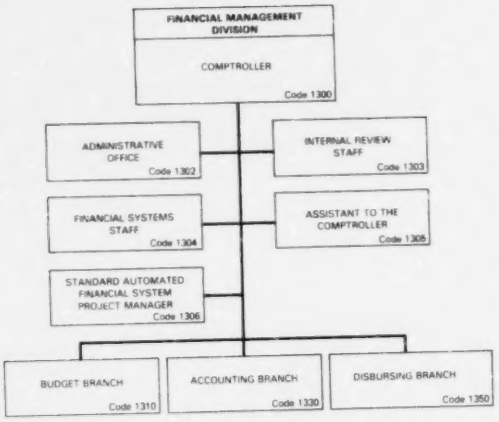
Cost Accounting


F-138

Fiscal Disbursing

Mr. R. W. Steinbeck

F-29



Basic Responsibilities

The Comptroller is the financial adviser to the Commanding Officer, the Director of Research, and other officials of the Laboratory and administers the financial program of the Laboratory.

The Financial Management Division provides service to the Laboratory in budget formulation and funds administration, program and budget analysis, accounting and reporting, and disbursing. In addition, it provides internal review and control services to protect the integrity of the Laboratory's financial operations.

Key Personnel

Name	Title
Mr. R.W. Steinbeck	Comptroller
Mrs. D.E. Erwin	Administrative Officer
Mr. K. Hildreth	Head, Internal Review Staff
Mr. A. De Somma	Supervisory Systems Accountant
Mr. E.S York	Assistant to the Comptroller
Mr. T.J. Santmyer	Head, Financial Systems Staff
Mr. A. De Somma†	Project Manager, Standard Automated Financial System (STAFS)
Mr. T.J. Santmyer	Head, Budget Branch
Mr. M.C. Mills	Head, Accounting Branch
Mrs. H. McCauley	Head, Disbursing Branch

Personnel

Full-time civilian: 78

† Additional duty

Civilian Personnel Division

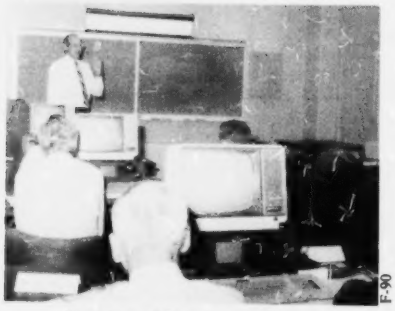
- PERSONNEL OPERATIONS
- EMPLOYEE DEVELOPMENT
- EMPLOYEE RELATIONS

F-88

Personnel Actions, Records, and Reports

F-89

Personnel Operations Reception Area



F-90

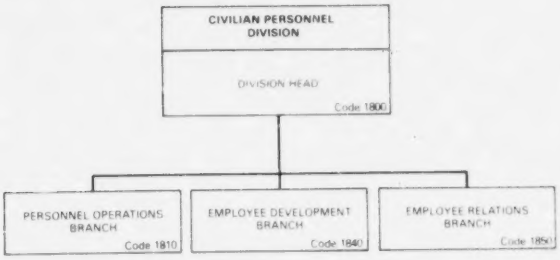
Training—Management Use of Personal Computers

F-91

Providing Employee Assistance

F-92

Mr. D.J. Blome



Director of Civilian Personnel

The Director of Civilian Personnel (ONR Code 790) of the Consolidated Civilian Personnel Office (Headquarters, ONR, NRL, and Naval Ocean Research & Development Activity) is Mr. F.D. Wallace. His office is located at the Office of Naval Research, Ballston Towers #1, 800 North Quincy Street, Arlington, VA 22217. The on-site NRL division head is Mr. D.J. Blome.

Basic Responsibilities

The Civilian Personnel Division administers the Laboratory's personnel program, which includes selection, development, promotion, utilization, appropriate recognition, and employee counseling and services for all civilian personnel.

Key Personnel

Name	Title
Mr. F.D. Wallace	Director of Civilian Personnel (ONR Code 790)
Mr. D.J. Blome	Head, Civilian Personnel Division
Mrs. D.L. Grater	Administrative Officer
Mr. D.J. Blome†	Head, Personnel Operations Branch
Mr. A.H. Sass	Head, Employee Development Branch
Mr. F. Carter	Head, Employee Relations Branch

Personnel

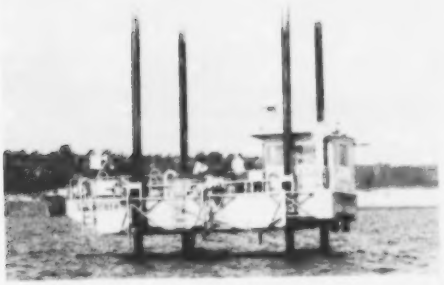
Full-time civilian: 45

†Additional duty

Technical Services Directorate

Technical Services Directorate

The Technical Services Directorate provides administrative and technical services required to support the mission of the Laboratory. This support is in the areas of technical information; facility construction and maintenance; engineering design and fabrication, supply; operating and maintaining the Laboratory's central computer facilities; and providing administrative information to management. In addition, the Directorate operates and maintains a field facility for NRL research at the Chesapeake Bay.



F-150

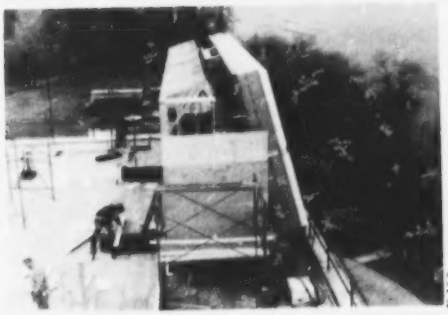
Mobile Offshore Stationary Platform

F-152

Precision Chassis Assembly

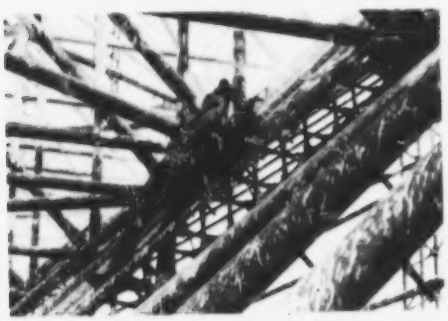
F-151

Sorting the Mail—Approximately 10,000 Pieces are Handled Daily!



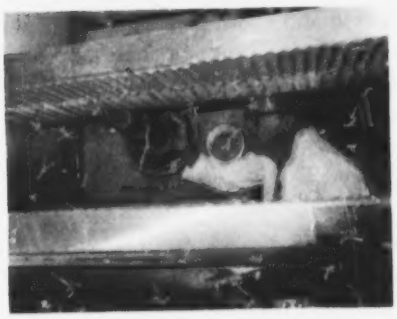
F-153

Public Works Carpenters at Chesapeake Bay Detachment Antenna Site



F-154

Technical Information Division Photographer Recording Repainting of MADRE Antenna Array



Programmable Vertical Milling Machine

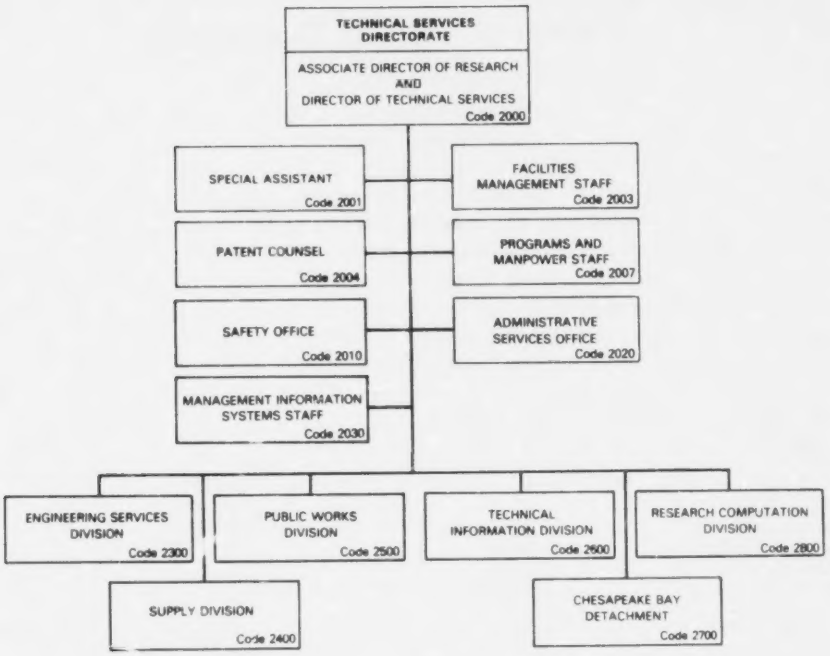
Associate Director of Research for Technical Services

Mr. Jack D. Brown

Mr. Brown was born in Port Huron, Michigan on May 21, 1922. He graduated from Michigan State University in 1943, with a BS degree in Physical Chemistry. He was called to active duty in the U.S. Army in 1943, and remained on active duty until he joined the Naval Research Laboratory on March 1, 1971.

Mr. Brown served as Associate Superintendent of the Plasma Physics Division from 1971 to 1981 when he was assigned duties as Associate Director of Research for Technical Services. In addition to his regular duties, he has been responsible for organization and operation of a number of Laboratory-wide multidisciplinary study efforts on nonacoustic ASW and anomalous geophysical phenomena.

During his military service, Mr. Brown was designated an Atomic Energy Specialist and engaged in research and teaching in long-range detection of nuclear explosions, development and testing of nuclear weapons, and the effects of nuclear explosions in space. During this period he planned or served as technical director for nuclear effects tests in space, underground, and over open ocean. He also organized and coordinated major geophysical expeditions to observe solar eclipses and polar cap ionospheric events. From 1952 to 1953 he served as a guest scientist at the National Bureau of Standards where he investigated the infrared emissivity of metals at cryogenic temperatures.



Key Personnel

Name	Title	Code
Mr. J.D. Brown	Associate Director of Research for Technical Services	2000
Ms. C.A. Gardinier	Head, Facilities Management Staff	2003
Dr. W.T. Ellis	Patent Counsel	2004
Mrs. J. Cummings	Head, Programs and Manpower Staff	2007
Mr. H.C. Kennedy, Jr.	Safety Officer	2010
Mrs. L.V. Dabney	Head, Administrative Services Office	2020
Mr. R. Guest	Head, Management Information Systems Staff	2030
LCDR M.L. Crouch, USN	Engineering Services Officer	2300
LCDR T.M. Lippert, SC, USN	Supply Officer	2400
CDR J.P. Collins, CEC, USN	Public Works Officer	2500
Mr. E.E. Kirkbride	Head, Technical Information Division	2600
CDR R.S. Holtz, USN	Chesapeake Bay Detachment Officer	2700
Mr. A.B. Bligh	Head, Research Computation Division	2800

Office of Patent Counsel
(Code 2004)

Basic Responsibilities

The Office of Patent Counsel provides services concerning inventions, patents, patent royalty charges, trademarks, copyrights, technical data rights, computer software licensing, and other related matters. Patent applications are prepared, filed, and prosecuted on NRL inventions of significance to the Federal government. The patent counsel serves as consultant and adviser on patent and data clauses in research and development and procurement contracts, claims of patent or copyright infringement involving NRL, and the provisions in interagency agreements relating to inventions, patents, trademarks, copyrights, and related matters. Assistance is provided to the research directorates through state-of-the-art searches in the patent literature pertinent to particular research problems.

Key Personnel

Name	Title
Dr. W.T. Ellis	Patent Counsel

Personnel

Full-time civilian: 9

F-35

Dr. W.T. Ellis

Safety Office
(Code 2010)

Basic Responsibilities

The Safety Office administers the Laboratory's safety and occupational health programs except in the fields of microwave and radiological safety. Its responsibilities include inspection, training, and education. It also conducts accident investigations, prepares directives, provides accident prevention information, directs the activities of safety representatives and committees, reviews hazardous experiments, and guides management in matters of safety.

Key Personnel

Name	Title
Mr. H.C. Kennedy, Jr.	Head, Safety Office

Personnel

Full-time civilian: 5

F-11

Mr. H.C. Kennedy, Jr.

Administrative Services Office
(Code 2020)

Basic Responsibilities

The Administrative Services Office plans, directs, and coordinates the following administrative services for the Laboratory: records and correspondence management; mail handling and messenger service; managing the purchase, acquisition, issuance, and withdrawal of filing equipment; managing the Forms Management Program, Paperwork Reduction Program, Reports Management Program, Correspondence Training Program, and Parking Facilities Management Program; coordinating and publishing the NRL Code Directory; and coordinating staffing plans for the Technical Services Directorate.

Key Personnel

Name	Title
Mrs. L.V. Dabney	Head, Administrative Services Office
Mrs. M. Bozzi	Administrative Officer
Ms. L.T. Warder	Head, Records and Correspondence Management Branch
Mr. C.D. Moultrie	Head, Mail and Messenger Branch

F-169

Mrs. L.V. Dabney

Personnel

Full-time civilian: 24

Management Information Systems Staff
(Code 2030)

Basic Responsibilities

The Management Information Systems Staff has dual responsibilities: conducting administrative data processing for the Laboratory, and designing, implementing, and controlling the Laboratory Management Information System (MIS) and its data bases. The Staff Head participates directly with the Commanding Officer, the Director of Research, and the Director of Technical Services, in all policy matters pertaining to MIS and business data processing.

Key Personnel

Name	Title
Mr. R.L. Guest	Head, Mgt. Info. Sys. Staff
Mrs. M. Bozzi	Administrative Officer
Mr. R.L. Guest*	Head, Systems Development Section
Mr. W.L. Gollaher	Head, Applications Systems Support
Mrs. L. Johnson	Head, Operations Section

F-172

Mr. R.L. Guest

Personnel

Full-time civilian: 23

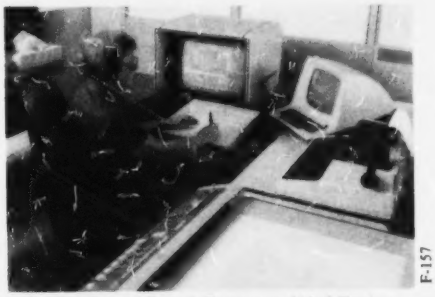
*Acting

Engineering Services Division

- **MECHANICAL ENGINEERING AND DRAFTING**
- **ELECTRONIC ENGINEERING AND FABRICATION**
- **QUALITY ASSURANCE**
- **INDUSTRIAL SERVICES**

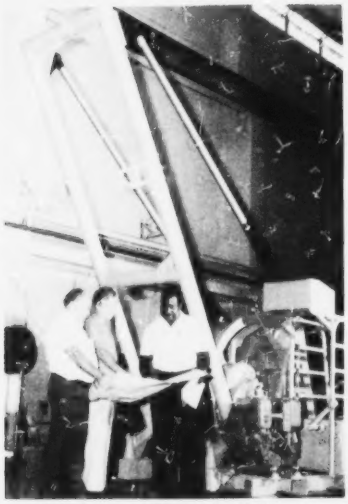
F-156

Electronic Assembly



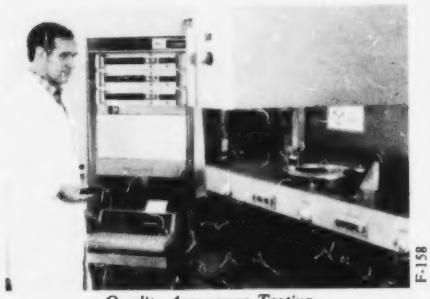
F-157

Printed Circuit Board Computer-Aided Design



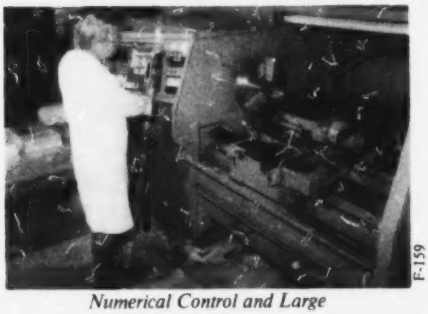
F-36

Machine and Sheet Metal Shop



F-158

Quality Assurance Testing



F-159

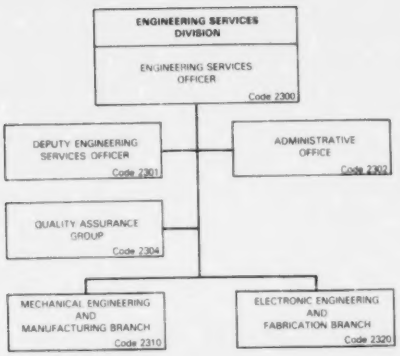
Numerical Control and Large Equipment Machining

F-160

Semiautomatic Wire Wrapping

F-140

LCDR M.L. Crouch, USN



Basic Responsibilities

The Engineering Services Division provides the engineering, design, fabrication, assembly, and test of experimental research equipment in support of the Laboratory's research efforts.

Complete services covering the fields of mechanical and electronic engineering, fabrication, and manufacturing are provided and are supported by an in-house Quality Assurance Group. Emphasis is placed on quick reaction and flexibility to meet the needs of the Laboratory's research programs.

Mechanical support covers the areas of project engineering, mechanical design, computer-aided thermal and stress analysis, drafting, and testing; it includes shops for machining, sheet metal work, welding, plating, plastic fabrication, engraving, and silk screen artwork.

Electronic support covers the spectrum of project engineering, digital and analog design, computer-generated (REDAC) printed circuit design, drafting, printed circuit fabrication, electronic assembly and testing, and cable fabrication.

Key Personnel

Name	Title
LCDR M.L. Crouch, USN	Engineering Services Officer
Mrs. A. Cox	Administrative Officer
Mr. M.A. Shimkus	Deputy Engineering Services Officer
Mr. Q.A. Blush	Quality Assurance Group
Vacancy	Head, Mechanical Engineering and Manufacturing Branch
Vacancy	Head, Electronic Engineering and Fabrication Branch

Personnel

Full-time civilian: 163
Military: 1

Supply Division

- STAFF SERVICES
- AUTOMATED INVENTORY MANAGEMENT SYSTEM
- PURCHASING
- RECEIPT CONTROL
- MATERIAL
- TECHNICAL

F-22(1)

Material Issue

F-22(2)

Receipt Control

F-22(3)

Purchasing/Requisition Control

F-22(4)

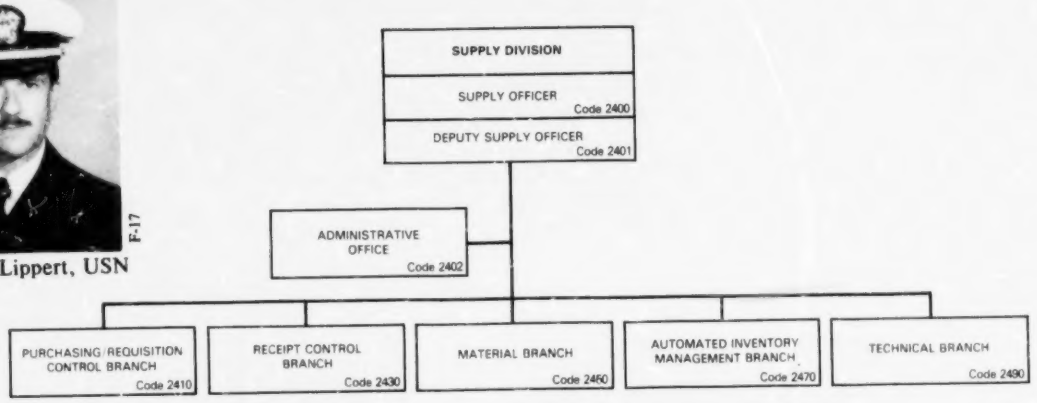
Administrative Office

F-22(5)

Automatic Inventory

F-17

LCDR T. Lippert, USN



Basic Responsibilities

The Supply Division provides logistical functions to the Laboratory and its field activities, including the operation of supply issue stores; procurement of equipment, material, and contractual services; receipt, inspection, and delivery of material and equipment; packing, shipping, and traffic management; and disposal of excess and unusable property. In addition, the Division offers technical services to the research directorates in the development of specifications for a complete procurement package and guidance in the performance stages of contractual services.

During FY 1984, the Supply Division processed 38,000 purchasing actions, which totaled approximately $42,000,000. Inventory in the seven retail stores and bulk warehouse averaged $1,100,000 and 9,000 line items.

Key Personnel

Name	Title
LCDR T. Lippert, SC, USN	Supply Officer
Mr. S. Georgeadis	Deputy Supply Officer
Mrs. Cynthia Hartman	Head, Administrative Office
Mr. W.R. Waynes	Head, Purchasing/Requisition Control Branch
Mr. J.J. Dupcavitch	Head, Receipt Control Branch
Mr. A.W. Medley, Sr.	Head, Material Branch
Mrs. E.I. Woodland	Head, Automated Inventory Management Branch
Mr. A.E. Dean	Head, Technical Branch

Personnel

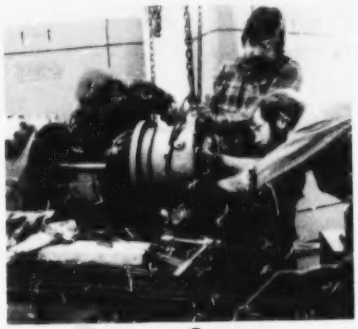
Full-time civilian: 133
Military: 1

Public Works Division

- ENGINEERING
- MAINTENANCE, UTILITIES, AND TRANSPORTATION
- MAINTENANCE CONTROL
- ADMINISTRATION
- CONTRACTS

F-162

Modifying Computer Room Floor Tiles

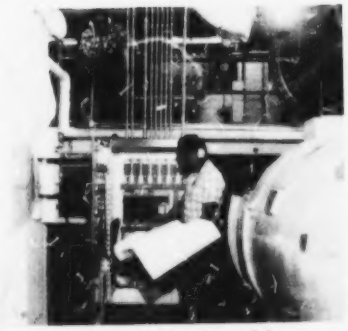


F-163

Repairing a Compressor

F-164

Woodworking Shop



F-165

Checking Operation of the Chilled Water Plant

F-167

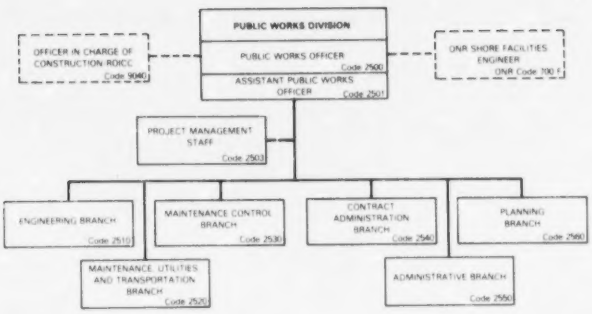
Public Works Service Desk

F-168

Providing Engineering Support

F-37

CDR J.P. Collins,
CEC,USN



Basic Responsibilities

The Public Works Division is responsible for the physical plant of NRL. This includes: (a) responsibility for the design, construction, maintenance, and repair of public works and utilities; (b) responsibility for the operation of these public works and utilities in accordance with the technical standards of the Naval Facilities Engineering Command; and (c) supporting the scientific program of the Laboratory by the construction, repair, and alteration of experimental and test equipment. In addition, the Division obtains required approvals for work for which the Division is responsible from the Chesapeake Division of the Naval Facilities Engineering Command, the Office of Naval Research, the Secretary of the Navy, and other authorities as appropriate.

The Public Works Division also supports the Office of Naval Research for Facilities Coordination and supports the Resident Officer in Charge of Construction on all Naval Facilities Engineering Command and certain research and development contracts at NRL.

Key Personnel

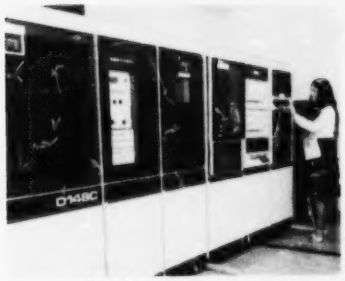
Name	Title
CDR J.P. Collins, CEC,USN	Public Works Officer/Officer in Charge of Construction/ONR Shore Facilities Engineer
LT R. Hunter, USN	Assistant Public Works Officer
Vacant	Head, Engineering Branch
Mr. L.P. Carpenter	Head, Maintenance, Utilities, & Transportation Branch
Mr. J.P. Kosker	Head, Maintenance Control Branch
Mrs. A. Coats	Head, Administrative Branch
Mr. D. Price	Head, Planning Branch

Personnel

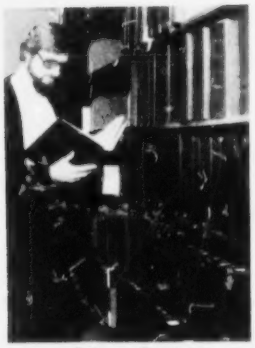
Full-time civilian: 326
Military: 2

Technical Information Division

- INFORMATION SERVICES
- TECHNICAL LIBRARY
- PUBLICATIONS
- PHOTOGRAPHIC


F-145

DICOMED Computer


F-146

Library Services

F-147

Exhibits

F-148

Service Desk

F-149

Presentation Support

F-132

Computerized Technical Composition

F-133

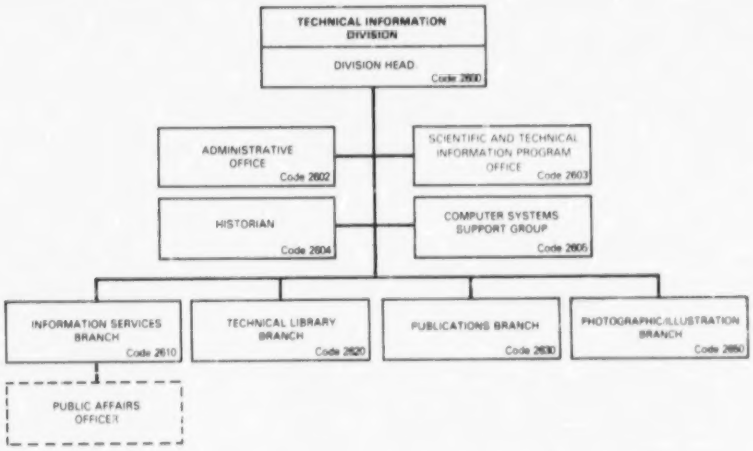
Internal Communication

F-131

Graphic Services

F-161

Mr. E. E. Kirkbride



Basic Responsibilities

The Technical Information Division provides centralized support to the Laboratory, and sometimes the Office of Naval Research, in the collection, retention, processing, publishing, presenting, and distribution of information in many forms to many audiences.

The following are the specific ways the Technical Information Division supports the Laboratory: by providing a full range of Library services, editing and publishing of periodicals and reports, scientific and general photographic services, illustration and visual aid services, scientific composition, special projects graphics, auditorium and meeting support, collection and maintenance of historical data, exhibits construction and showing, video data gathering services, management of public and internal information programs (publishing Labstracts, NRL's biweekly newspaper), and conducting Freedom of Information Act activities as required by law.

Key Personnel

Name	Title
Mr. E.E. Kirkbride	Head, Technical Information Division
Mrs. C. Uffelman	Administrative Officer
Dr. J.A. Pitts	Historian
Mr. J. Lucas	Head, Computer Systems Support Group
Mr. J.W. Gately, Jr.	Head, Information Services Branch and Public Affairs Officer†
Mr. P. Imhof	Head, Technical Library Branch
Mr. T. Calderwood	Head, Publications Branch
Mr. W.B. Connick	Head, Photographic/Illustration Branch

Personnel

Full-time civilian: 113

†Additional duty

Chesapeake Bay Detachment

- ADMINISTRATIVE
- SECURITY
- OPERATIONS
- MAINTENANCE AND SUPPORT

F-143

45-ft Workboat

F-51

Tactical Electronic Warfare Vans

F-170

Fire Testing Facility

F-52

Tilghman Island Test Facility

Research Division Representatives

Optical Sciences Division
Mr. C. Gott, Field Experiments

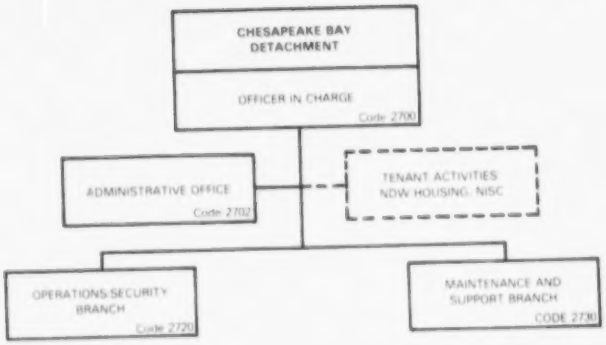
Radar Division
Mr. J. Ahearn, Radar Division
Mr. M. Siegert, Target Characteristics Branch
Mr. P. Ward, Search Radar Branch
Mr. J.T. Ferrell, Radar Techniques Branch

Tactical Electronic Warfare Division
Mr. V. J. Kutsch, Tactical Electronic Warfare Division

Space Systems Division
Mr. P. T. Boltz, Impact Vulnerability Staff

Chemistry Division
Dr. H. W. Carhart, Fire Test Facility

CDR R. S. Holtz, USN



Basic Responsibilities

The Chesapeake Bay Detachment operates and maintains an independent military facility for NRL research. It has a variety of shops, plant facilities, and specialized equipment used in support of the variety of NRL and tenant research and development projects which can best be carried out there.

The Physical Plant

Located in a relatively clear area away from congestion and industrial interference, the main site, at Randle Cliff, Maryland, covers 68.1 hectares (167.9 acres) and has 183 structures of various sizes and types of construction, six of which are major laboratory buildings. There is over 86 m (282 ft) of usable dock space with a controlling water depth of 2.1 m (7 ft), located 3.2 km (2 mi) north of the main site in Chesapeake Beach. Off-site facilities include the Tilghman Island Facility, located directly across the Bay from CBD at a range of 16.25 km (10 mi).

Research watercraft available at CBD include 17-m (56-ft) landing craft, one jack-up-barge, one 14-m (45-ft) support craft, one 11-m (36-ft) patrol boat and, an 8-m (26-ft) motorboat. These are used in support of research projects and for transportation to off-site facilities.

Key Personnel

Name	Title
CDR R.S. Holtz, USN	Officer in Charge
Mrs. M.J. Hamor	Administrative Officer
Mr. W.S. Kratz	Security Officer
Mr. L. Phelps*	Operations Officer
Mr. J.G. Grigg	Maintenance Support Officer

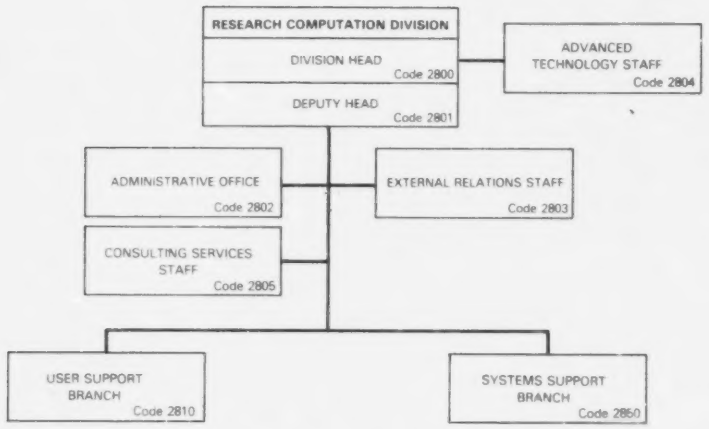
Personnel

Full-time civilian: 21
Military: 1

*Acting

Research Computation Division

Mr. Rudi F. Saenger



Basic Responsibilities

The Research Computation Division (RCD) provides for the operation and maintenance of the Laboratory's central computer facilities for the benefit of all divisions and detachments of the Laboratory; provides system software support services for its computers; and provides a variety of user support services. The RCD also provides appropriate ADP technical logistic support services for NRL; identifies ADP requirements and may secure and administer contractual ADP support services; and supports the Navy Laboratory Computing Committee and the Navy Laboratory Computer Network. The Head of the RCD, by additional duty assignment, is the ONR Special Assistant for ADP Coordination.

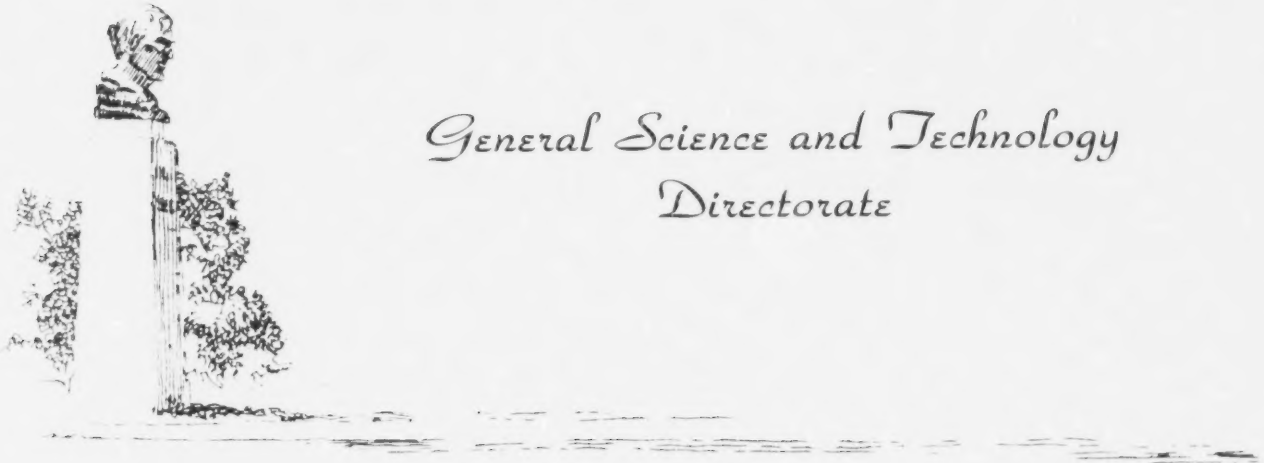
Key Personnel

Name	Title
Mr. Rudi F. Saenger	Head, Research Computation Division
Ms. D.E. Gossett	Deputy Head
Ms. B.M. Thomas	Administrative Officer
Mr. J.B. Smith	External Relations Staff
Mr. Rudi F. Saenger*	Head, Advanced Technical Staff
Mr. G.J. Flenner	Head, Consulting Services Staff
Mr. George E. Perez	Head, User Support Branch
Mr. Henry K. Brock	Head, Systems Support Branch

Personnel

Full-time civilian: 40

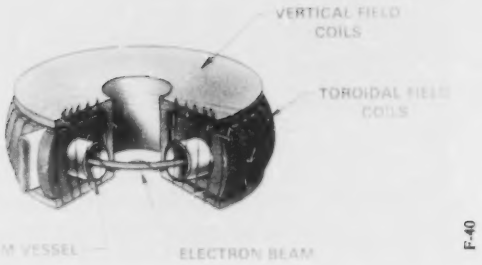
*Acting



General Science and Technology Directorate

General Science and Technology Directorate

The Navy's operational effectiveness depends upon its ability to keep pace with today's rapidly developing technologies. This Directorate contributes to this requirement by maintaining capabilities in, and cognizance of, a wide variety of state-of-the-art scientific research areas. These include modern computational physics; astrophysics; atmospheric, ionospheric, space, and plasma sciences; and pulsed power technologies. Areas of strong emphasis include solar physics, wide-spectrum astronomy, fluid mechanics and hydrodynamics, modeling of atmospheric and ionospheric processes, nuclear weapons effect simulation, high-energy density storage devices, and controlled energy programs.

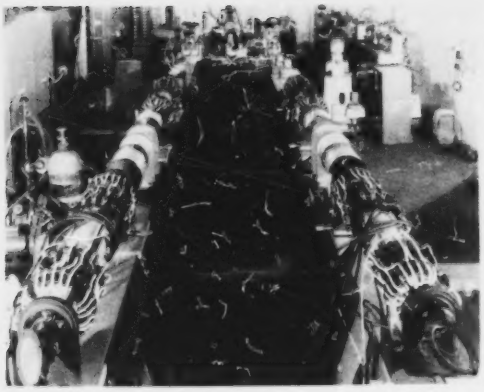


F-40

Modified Betatron

F-42

Weather Balloon Launch



F-41

Pharos II Glass Laser System

F-43

Controlling Operation of HRTS

Associate Director of Research for General Science and Technology

Dr. William R. Ellis

Dr. Ellis was born in Greeneville, South Carolina, on January 22, 1940. He attended Clemson University where he obtained his undergraduate degree in physics. He then attended Princeton University where he obtained an M.S. degree in 1965 and, in 1967, one of the first doctorates in the emerging field of plasma propulsion for spacecraft.

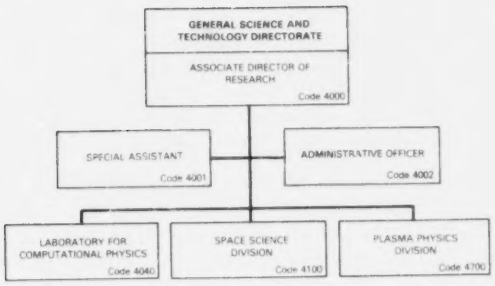
The next three years found him at the Culham Laboratory for Plasma Physics and Fusion Research in England, where he headed an experimental group investigating toroidal discharge physics problems in plasma confinement. This marked the beginning of his long involvement with the fusion program.

In 1970 he accepted a position with the Los Alamos Scientific Laboratory in New Mexico where he became Associate Group Leader for the Scyllac experimental group in the Controlled Thermonuclear Research Division.

In 1976, Dr. Ellis joined the Energy Research and Development Administration (ERDA), the predecessor agency of the Department of Energy. In 1979, he was appointed Director of the Department's Mirror Confinement Systems Divison in the Office of Fusion Energy, Office of Energy Research, where he was responsible for programs to develop fusion power reactors based on the magnetic mirror confinement concept.

In October 1983, Dr. Ellis was appointed Associate Director of Research for General Science and Technology at the Naval Research Laboratory.

Dr. Ellis has published over 100 papers and reports in the areas of experimental and theoretical plasma physics and fusion research. He has been active in several scientific and professional societies and served on the Executive Committee of the American Physics Society, Division of Plasma Physics. He has served on numerous panels, including the Deparment of Energy's Fusion Coordinating Committee, the USA/USSR Joint Fusion Power Coordinating Committee, program committees for international plasma physics conferences, and has chaired many technical review groups.



Key Personnel

Name	Title	Code
Dr. W.R. Ellis	Associate Director of Research for General Science and Technology	4000
Mrs. L.T. McDonald	Special Assistant	4001
Dr. J.P. Boris	Chief Scientist, Laboratory for Computational Physics	4040
Dr. H. Gursky	Superintendent, Space Science Division	4100
Dr. S. Ossakow	Superintendent, Plasma Physics Division	4700

Space Science Division

Research Activity Areas

Atmospheric Physics
Boundary layer and electro-optics meteorology; aerosol and cloud atmospheric electricity

X-ray Astronomy
X-ray observation, analysis of space astronomical sources

Radio and Infrared Astronomy
Galactic/extragalactic radio/IR astronomy; VLBI interferometry, middle atmosphere microwave sensing

Ultraviolet Measurements
Ultraviolet astronomy; sensing/modeling of atmos/ionospheres

Gamma and Cosmic Ray Astrophysics
Gamma-ray astrophysics; solar-flare gamma-rays; space cosmic ray particle environment

Solar Physics
Solar ultraviolet spectroscopy, especially on shuttle/Spacelab

Solar-Terrestrial Relationships
Solar X-ray/EUV plasma diagnostics; coronal effects at earth

Ionospheric Effects
Ionospheric modification; ionospheric propagation, modeling

F-54

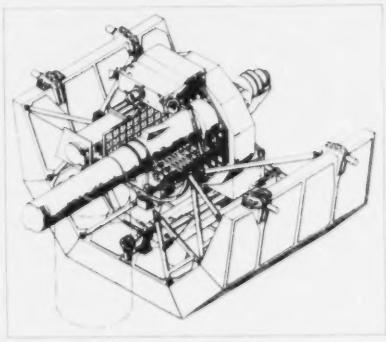
Marine Boundary Layer Experiment at San Nicolas, Is., CA

F-55

Spartan Satellite X-Ray Mission

F-56

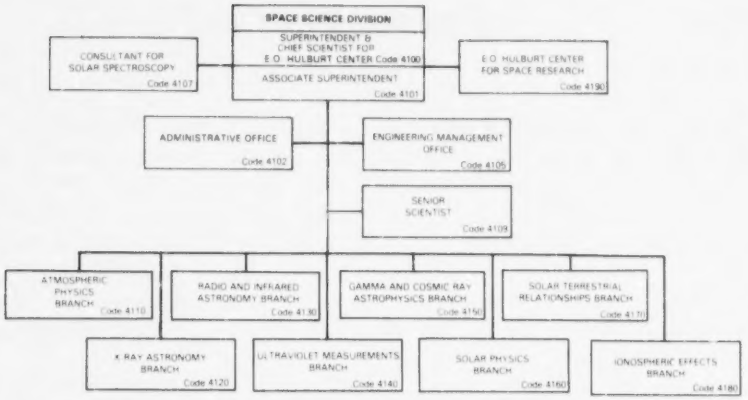
Radio Telescope at Maryland Point, MD


F-57

High Resolution Telescope and Spectrometer

Dr. H. Gursky

F-58


SPACE SCIENCE DIVISION
CONSULTANT FOR SOLAR SPECTROSCOPY Code 4107
SUPERINTENDENT & CHIEF SCIENTIST FOR E.O. HULBURT CENTER Code 4100
ASSOCIATE SUPERINTENDENT Code 4101
E.O. HULBURT CENTER FOR SPACE RESEARCH Code 4190
ADMINISTRATIVE OFFICE Code 4102
ENGINEERING MANAGEMENT OFFICE Code 4105
SENIOR SCIENTIST Code 4109
ATMOSPHERIC PHYSICS BRANCH Code 4110
RADIO AND INFRARED ASTRONOMY BRANCH Code 4130
GAMMA AND COSMIC RAY ASTROPHYSICS BRANCH Code 4150
SOLAR TERRESTRIAL RELATIONSHIPS BRANCH Code 4170
X RAY ASTRONOMY BRANCH Code 4120
ULTRAVIOLET MEASUREMENTS BRANCH Code 4140
SOLAR PHYSICS BRANCH Code 4160
IONOSPHERIC EFFECTS BRANCH Code 4180

Basic Responsibilities

The Space Science Division conducts research in the fields of astronomy and astrophysics, solar-terrestrial physics, and atmospheric science. Satellites, rockets, and ground-based facilities are used to obtain information on radiation from the sun and celestial sources, and to study the behavior of the ionosphere and high atmosphere. Radio telescopes are used for astronomical observations and atmospheric sensing. Research results are of importance to radio communications, to utilization of the space environment, to weather prediction, and to fundamental understanding of natural radiation and geophysical phenomena. The Superintendent also acts as Chief Scientist of the E.O. Hulburt Center for Space Research, created to provide research opportunities in space science to appointees from universities.

Key Personnel

Name	Title
Dr. H. Gursky	Superintendent
Dr. P. Mange	Associate Superintendent
Mrs. C.J. Marks	Administrative Officer
Vacant	Engineering Management Officer
Dr. R. Tousey	Consultant (Emeritus)
Dr. H. Gursky†	Chief Scientist, E. O. Hulburt Center for Space Research
Dr. H. Friedman	Chief Scientist (Emeritus) E. O. Hulburt Center for Space Research
Dr. G. Carruthers	Senior Astrophysicist
Dr. L. Ruhnke	Head, Atmospheric Physics Branch
Mr. G.G. Fritz	Head, X-Ray Astronomy Branch
Dr. K.J. Johnston	Head, Radio & Infrared Astronomy Branch
Dr. G.R. Carruthers	Head, Ultraviolet Measurements Branch
Dr. J.D. Kurfess	Head, Gamma and Cosmic Ray Astrophysics Branch
Dr. G.E. Brueckner	Head, Solar Physics Branch
Dr. G.A. Doschek	Head, Solar Terrestrial Relationships Branch
Dr. J.M. Goodman	Head, Ionospheric Effects Branch

Personnel

Full-time civilian: 127

R&D Budget

FY 1985: $26,227,000

†Additional duty

Plasma Physics Division

Research Activity Areas

High-Power Electromagnetic Radiation
- Application of high-current relativistic electron beams to microwave and millimeter wave generation
- Electron and ion accelerators

Experimental Plasma Physics
- Electron beam plasma interactions
- Plasma channels in air
- Experimental study of plasma chemistry

Laser Plasma
- Laser-plasma interaction
- Laser fusion
- Plasma diagnostics
- Large glass laser facility
- Radiation physics

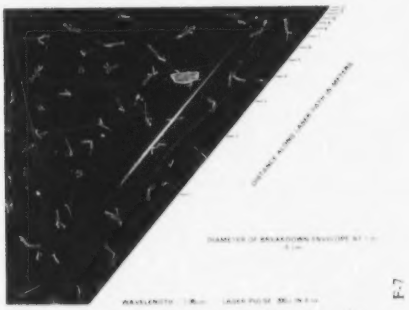
Plasma Radiation
- Radiation transport
- X-ray laser modeling
- Atomic structure and processes
- Radiation hydrodynamics

Advanced Accelerators
- Modified Betatron
- Autoaccelerator
- Collective Particle Accelerator

Plasma Technology
- Production of intense relativistic electron beams
- Electron beam propagation and focusing
- Experimental research in high-power exploding wires
- Generation of intense ion beams
- Inductive energy storage

Geophysical and Plasma Dynamics
- Theoretical and numerical simulation of atmospheric, ionospheric, and magnetospheric phenomena
- High-altitude nuclear weapons effects on the ionosphere/magnetosphere
- Solar-terrestrial relations
- Atmospheric-ionospheric-magnetospheric coupling

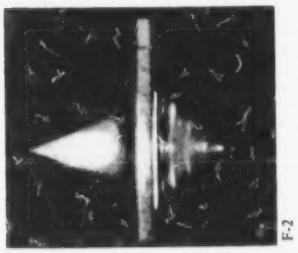
Plasma Theory
- Numerical simulation of high-density plasmas
- Theoretical study of nonlinear plasma dynamics
- Production and propagation of high-energy charged particle beams


F-7

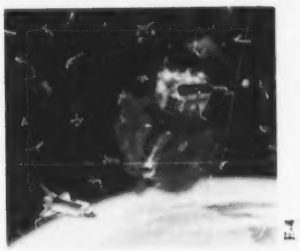
Laser-produced 10-m Long Spark in Air for Channeling Electron Beams

F-59

Homopolar Generator with Inductive Pulser Producing 3 MJ of Electromagnetic Energy

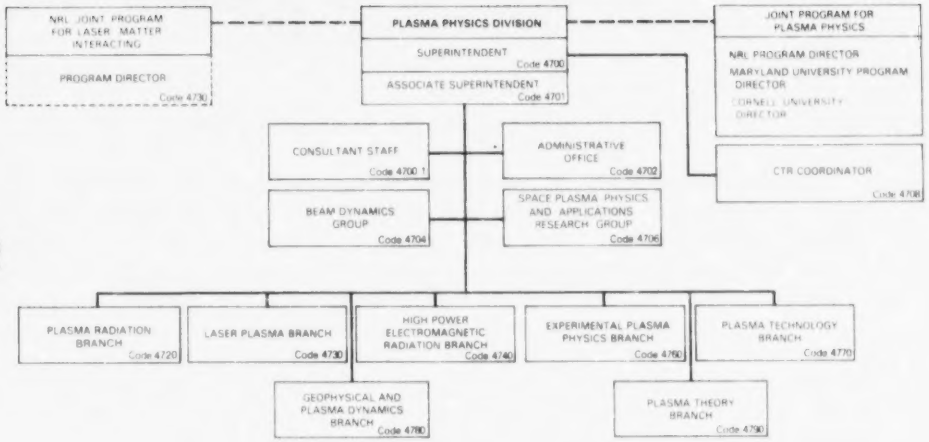

F-2

Air Breakdown Induced by High Power Microwaves from a Free Electron Laser


F-4

NRL Participation in NASA Chemical Release Experiments in Space

Dr. S. Ossakow



F-60

Basic Responsibilities

The Plasma Physics Division conducts a broad program in basic and applied research in plasma physics, electron beams, atomic physics, and laser physics. The effort of the Division is concentrated on a few closely coordinated theoretical and experimental programs. Considerable emphasis is placed on large-scale numerical simulations related to plasma dynamics, ionospheric, magnetospheric, and atmospheric dynamics, and the effects of high-altitude nuclear weapons on the atmosphere, thermonuclear plasma confinement, atomic physics, and relativisitic electron beam propagation. Areas of experimental interest include: relativistic electron beams, laser-matter interaction, thermonuclear fusion, electromagnetic wave generation, the generation of intense ion beams, advanced accelerator development, inductive energy storage, and the interaction of charged particle beams with the atmosphere.

Key Personnel

Name	Title
Dr. S. Ossakow	Superintendent
Mr. I. Vitkovitsky	Associate Superintendent
Dr. W. Ali	Consultant
Dr. P. Palmadesso	Consultant
Dr. M. Friedman	Consultant
Ms. T. Mason	Administrative Officer
Dr. C. Kapetanakos	Head, Beam Dynamics Group
Vacant	Head, Space Plasma Physics and Applications Research Group
Dr. A. Robson	Coordinator, CTR Program
Dr. J. Davis	Head, Plasma Radiation Branch
Dr. S. Bodner	Head, Laser Plasma Branch
Dr. W. Manheimer	Head, High-Power Electromagnetic Radiation Branch
Dr. A. Robson	Head, Experimental Plasma Physics Branch
Dr. G. Cooperstein	Head, Plasma Technology Branch
Dr. J. Huba	Head, Geophysical and Plasma Dynamics Branch
Dr. P. Sprangle	Head, Plasma Theory Branch

Personnel

Full-time civilian: 119

R&D Budget

FY 1985: $20,818,000

Laboratory for Computational Physics
(Code 4040)

Basic Responsibilities

The Laboratory for Computational Physics is responsible for the research leading to and the application of advanced numerical simulation techniques which are relevant to Navy, DoD, and other programs of national interest. The specific objectives of the Laboratory for Computational Physics are: to develop and maintain a state-of-the-art computational physics capability in fluid dynamics and related fields of physics, to perform analyses and computations on specific relevant problems using these capabilities, and to transfer this numerical technology to new and ongoing projects through cooperative programs with the research divisions and detachments at NRL and elsewhere. Areas of current interest include: studies of the hydrodynamic stability of imploding systems, solution of fluid dynamic flows which involve free surfaces for naval hydrodynamics and other applications, studies of combustion dynamics and reactive flow modeling in which convection and turbulent mixing may be important, modeling of ionospheric and heliospheric dynamics and chemistry, and pursuit of advanced numerical techniques for general application.

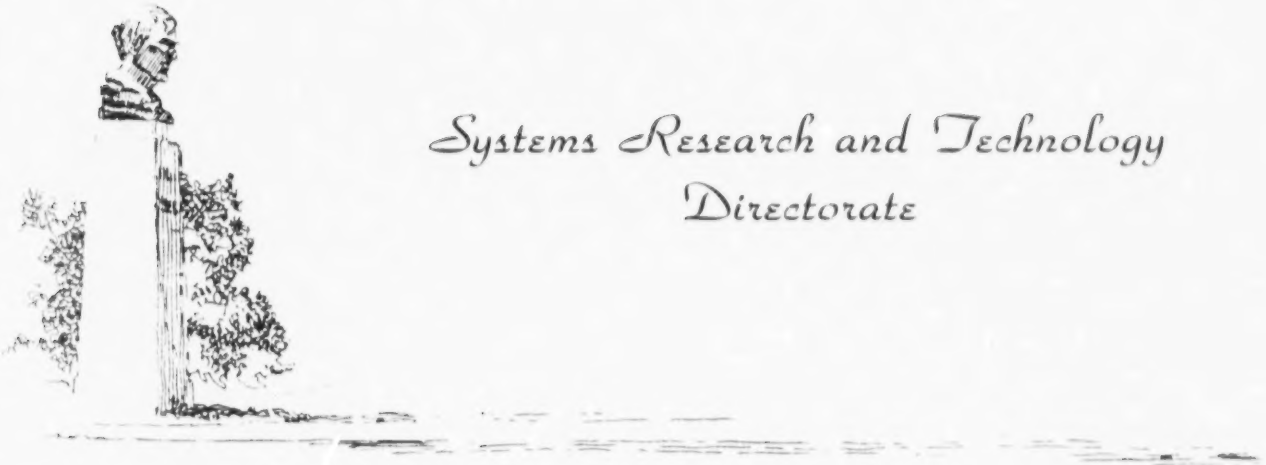
F-61

Dr. J. P. Boris

Key Personnel

Name	Title
Dr. J.P. Boris	Chief Scientist, Laboratory for Computational Physics
Ms. D. Miller	Administrative Officer
Dr. D.L. Book	Senior Scientist
Dr. E.S. Oran	Senior Scientist

Personnel		R&D Budget	
Full-time civilian:	11	FY 1985:	$2,213,000



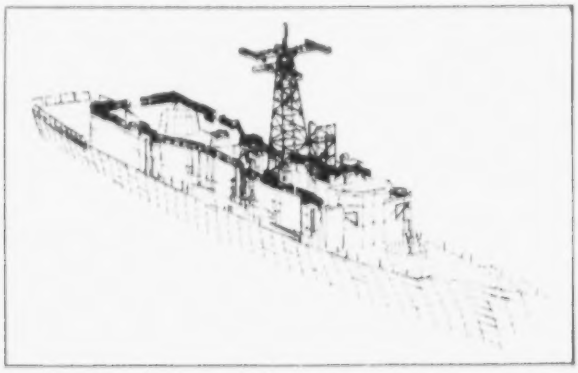
Systems Research and Technology
Directorate

Systems Research and Technology Directorate

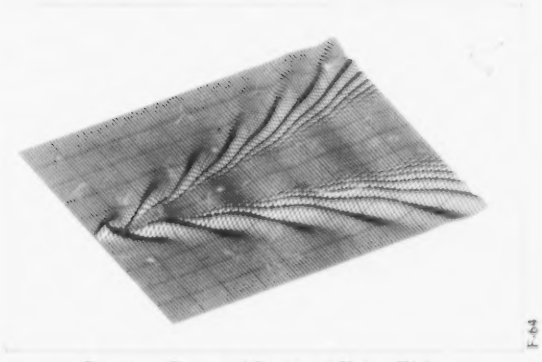
The Systems Research and Technology Directorate performs basic research and development in support of major generic Navy systems. The emphasis is on radar systems, electronic warfare systems, and undersea warfare systems. The Directorate conducts an extensive experimental program in the field, using both ship and aircraft platforms to support the above activities. Programs in ocean engineering, environmental factors, and calibration and standards for underwater acoustic devices are pursued in support of the R&D for Navy systems.

Electronic Warfare R&D Laboratory Complex. (Near wing is artist's rendition of future Coordinated EW Simulation Laboratory.)

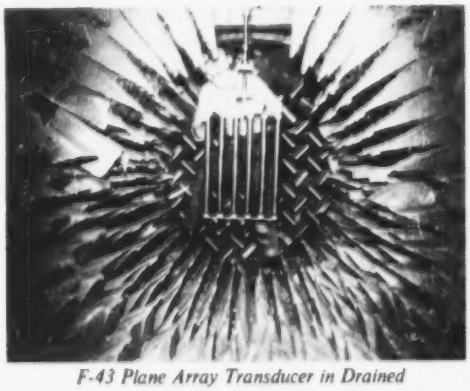
Ocean Acoustic Research



FFG-15 Cross Section Model



Computer-Generated Simulated Kelvin Wake



F-43 Plane Array Transducer in Drained Anechoic Tank

Associate Director of Research for Systems Research and Technology

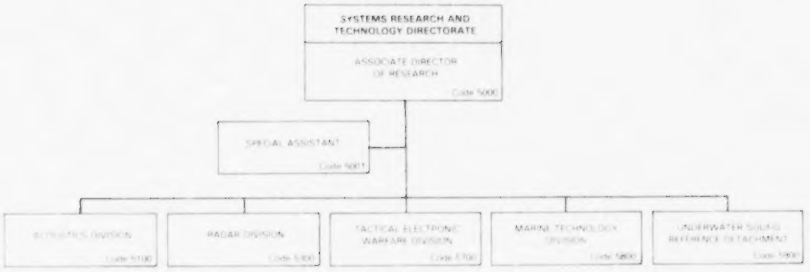
Mr. R. R. Rojas

Mr. Rojas was born in New York City on September 25, 1931. He attended City College of New York, where in 1952, he received a BEE degree. In 1961, he received an MEE degree from Drexel Institute of Technology, Philadelphia. Further graduate studies in mathematics and engineering were pursued at the University of Pennsylvania, Philadelphia.

From 1952 to 1960, Mr. Rojas was a project engineer in the Missile Department at Philco Corporation where he participated in the Talos, Terrier, and Tartar missile fuze programs, and the Terrier missile guidance project. While at Philco, he received a company achievement award for his work on the design of specialized missile test equipment. From 1960 to 1969, he was manager of the Hydroacoustics Department at the Magnavox General Atronics Corporation. At General Atronics he was active in the area of signal processing techniques as applied to sonar, communication systems, and seismic detection systems. In 1969, he joined the Naval Research Laboratory as Head of the Advanced Undersea Surveillance Program. In his capacity he was responsible for directing an experimental and theoretical program whose purpose was to evaluate and develop advanced surveillance systems for the Navy. Mr. Rojas served as Associate Director of Research and Director of Oceanology from 1977 until 1980, when he assumed control of the newly established Systems Research and Technology Directorate. Mr. Rojas also was on the graduate teaching staff at the Pennsylvania State University.

Mr. Rojas' research interests are centered on signal processing and the physics of underwater acoustic propagation, ambient noise, and reverberation.

Mr. Rojas is a member of the Acoustic Society of America, Sigma Xi, the Institute of Electrical and Electronics Engineers, and a charter member of the Marine Technology Society.



Key Personnel

Name	Title	Code
Mr. R.R. Rojas	Associate Director of Research for Systems Research and Technology	5000
Vacancy	Special Assistant	5001
Mr. B.G. Hurdle*	Superintendent, Acoustics Division	5100
Dr. M.I. Skolnik	Superintendent, Radar Division	5300
Dr. G.P. Ohman*	Superintendent, Tactical Electronic Warfare Division	5700
Dr. R.T. Swim	Superintendent, Marine Technology Division	5800
Dr. J.E. Blue	Superintendent, Underwater Sound Reference Detachment	5900

*Acting

Acoustics Division

Staff Activities, Field, and Laboratory Support

Special Programs Management
Systems studies
Systems concepts and evaluation
Engineering research and development

Research Activity Areas

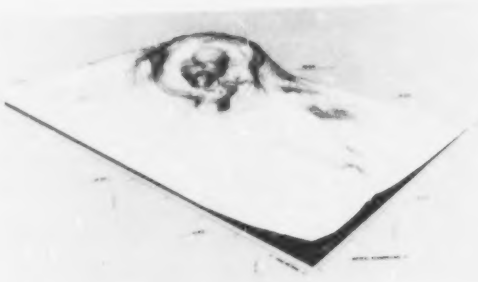
Acoustic Media Characterization
- Geophysical and oceanographic parameters that influence underwater acoustics

Applied Ocean Acoustics
- Airborne underwater acoustics
- Bottom-limited acoustics
- Arctic underwater acoustics
  - Propagation
  - Noise
- Ambient noise measurements and modeling
- Spectral estimation
- Signal Processing

Physical Acoustics
- Reflection, diffraction, scattering by bodies
- Target strength modeling
- Schlieren visualization
- Fiber-optic acoustic sensors
- Acoustics of coatings

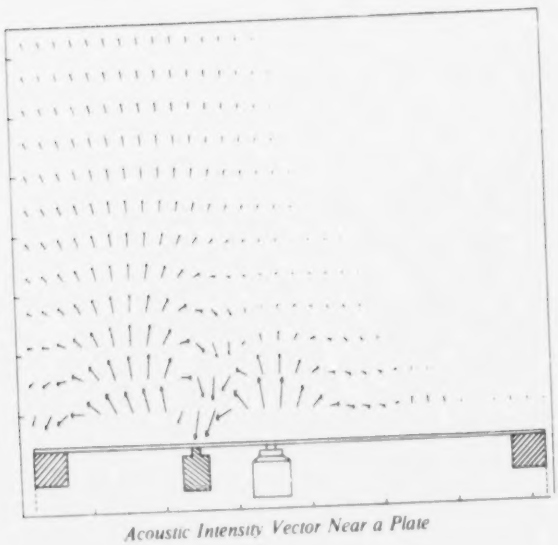
Software Systems Development
- Tactical computers
- Tactical support software
- Signal processors

Large Aperture Acoustics
- Propagation, coherence, and wave-front behavior
- Large-scale spatial and temporal integration
- Array deformation
- Low-frequency monostatic and bistatic reverberation
- Shallow-water acoustics
  - Mode analysis
  - Models of signal and noise fields



F-23

Detailed Bathymetry of Young Seamount



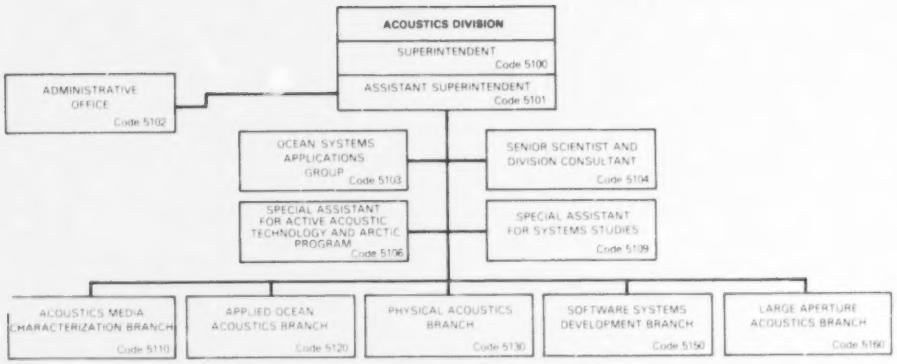
F-25

Acoustic Intensity Vector Near a Plate

F-24

Arctic Research

Mr. B. G. Hurdle



Basic Responsibilities

The Acoustics Division has major responsibilities for basic and applied R&D in the Navy's Undersea Warfare programs. Program work includes propagation, noise and scattering, environmental prediction, surveillance system concepts, systems analysis, acoustic research engineering, radiation and transduction, target echo characteristics, and physical acoustics. The Division conducts theoretical and experimental research programs in ocean acoustics; develops models of the interaction of acoustic energy with the ocean environment and with structures; and conducts experiments in the deep ocean, in acoustically shallow water, and in the Arctic. The Division carries out theoretical and experimental research and development in computer configuration, computer operating systems, and software and human interface requirements for computers and in Naval applications. It participates in the Fiber Optic Sensor System (FOSS) program. The Division program is heavily oriented toward R&D in support of undersea surveillance and antisubmarine warfare, but it also supports other missions. Collaboration and cooperation with other parts of the Laboratory and with other laboratories, both U.S. and foreign, is an integral part of the total Division program. The Division also participates in major groups formulating the Navy's ASW program and renders consultative services to the Navy, the Department of Defense, other government agencies, and private contractors.

Key Personnel

Name	Title
Mr. B.G. Hurdle*	Superintendent
Mr. B.G. Hurdle	Assistant Superintendent
Mrs. N.J. Beauchamp	Administrative Officer
Dr. S. Hanish	Senior Scientist and Division Consultant
Mr.M. Potosky	Special Assistant for Systems Studies
Mr. D. Steiger	Head, Ocean Systems Applications Group
Dr. H.S. Fleming	Head, Acoustics Media Characterization Branch
Dr. O. Diachok*	Head, Applied Ocean Acoustics Branch
Dr. J. Bucaro	Head, Physical Acoustics Branch
Mrs. E.E. Wald	Head, Software Systems Development Branch
Dr. B.B. Adams	Head, Large Aperture Acoustics Branch

Personnel

Full-time civilian: 120

R&D Budget

FY 1985: $15,556,000

*Acting

Radar Division

Staff Activities

Systems research
Electromagnetic propagation
Electromechanical design

Research Activity Areas

Radar Analysis
- Automatic detection and tracking
- Radar signal processing
- Radar systems simulations
- Target signature modeling

Radar Techniques
- High-frequency over-the-horizon radar
- Signal analysis

Search Radar
- Shipboard surveillance radar
- Precision tracking techniques
- Air traffic control

Target Characteristics
- Radar counter-countermeasures
- Adaptive signal processing
- Phased array radar
- Target signature analysis

Identification Systems
- Mark XII IFF improvements
- NATO Identification System (Mk XV)
- Future identification technology

Airborne Radar
- Airborne early-warning radar (AEW)
- Space-based radar
- Inverse synthetic aperture radar (ISAR)

Electromagnetics
- Microwave antenna research
- Phased array antennas
- Adaptive array research

Systems Control and Research
- Image processing research
- Synthetic aperture radar (SAR) processing
- Multispectral image correlation
- Space sensor and mission analysis

F-67

CBD Radar Test Site

F-3

Directed Mirror Antenna Radar (DMAR) (Foreground)

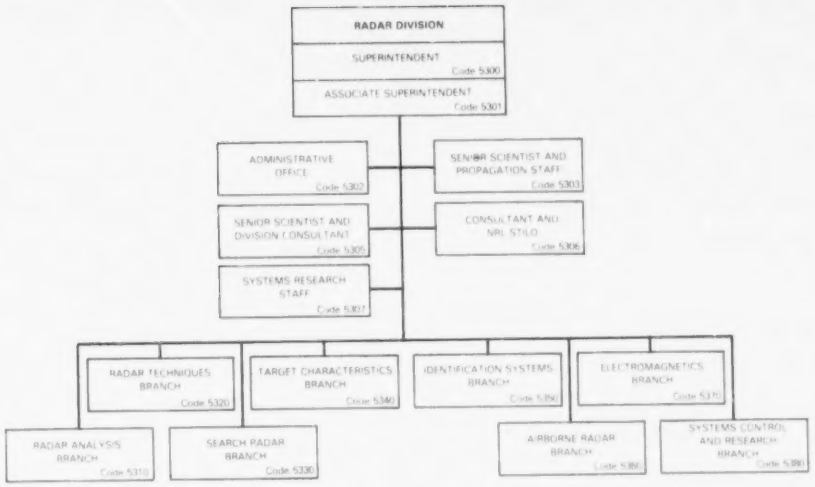
F-15

Shipboard Phased Array Radar (FASR)

F-68

Shipboard Air Surveillance Radar (SENRAD) Antennas

Dr. M. I. Skolnik



Basic Responsibilities

The Radar Division conducts research on basic physical phenomena of importance to radar and related sensors, investigates new engineering techniques applicable to radar, demonstrates the feasibility of new radar concepts and systems, performs related systems analysis and evaluation of radar, and provides special consultative services. The emphasis is on new and advanced concepts and technology in radar and related sensors which are applicable to enhancing the Navy's ability to fulfill its mission.

Key Personnel

Name	Title
Dr. M.I. Skolnik	Superintendent
Mr. I.D. Olin	Associate Superintendent
Ms. Denise Elliot	Administrative Officer
Dr. L.B. Wetzel	Senior Scientist and Head, Propagation Staff
Mr. H. Bress	Consultant and NRL STILO
Mr. B.C. Dodson	Head, Systems Research Staff
Dr. G.V. Trunk	Head, Radar Analysis Branch
Mr. J.M. Headrick	Head, Radar Techniques Branch
Dr. C.L. Temes	Head, Search Radar Branch
Mr. S.K. Meads	Head, Target Characteristics Branch
Mr. C.M. Veronda	Head, Identification Systems Branch
Mr. T.L. apRhys	Head, Airborne Radar Branch
Mr. T.C. Cheston	Head, Electromagnetics Branch
Dr. A.F. Petty	Head, Systems Control & Research Branch

Personnel

Full-time civilian: 139

R&D Budget

FY 1985: $18,345,000

Tactical Electronic Warfare Division

Staff Activities

Long-Range EW Planning
- Long-range Navy EW research and development planning
- R&D resource requirements

Lead Laboratory Coordinating
- EW Program Liaison
- Program reference center
- Navy Electronic Warfare Advisory Group (NEWAG)
- Navy 5 yr. EW Plan

Central Target Simulator Program
- Develop and operate CTS Facilities
- Hardware-in-the-loop modeling

Effectiveness of Naval EW Systems (ENEWS)
- EW effectiveness
- Simulation analysis and measurement
- Research and development support

Special Project Group
- Vulnerability analyses
- Special countermeasures
- Threat signal analysis

Counter C^3 I
- Battle Group C-C^3 systems concepts
- C-C^3 exploratory R&D requirements

Special Facilities Development Group
- Long-range facility planning
- Facility update and modernization
- Interactive facility integration

Research Activity Areas

Ships Electronic Warfare Systems
- Ships systems development
- Jamming technology
- Deception techniques
- EW antennas
- Threat simulators

Airborne Electronic Warfare Systems
- Air systems development
- Penetration aids
- Power source development
- Jamming and Deception

Off-Board Countermeasures
- Expendable technology
- Expendable devices
- Off-board systems
- Decoys

Electronic Warfare Support Measures
- Intercept systems and direction finders
- RF signal simulators
- Systems integration
- Command and control interfaces
- Signal processing

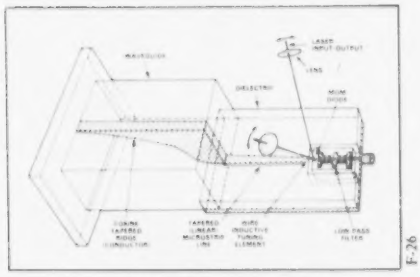
Advanced Techniques
- Analysis and modeling simulation
- New EW techniques
- Experimental systems
- EW concepts

F-144

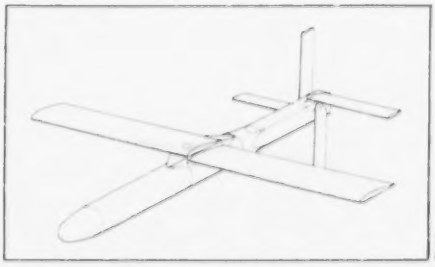
Central Target Simulator Facility Control Console

F-13

Electronic Warfare RDT&E Support Aircraft


F-26

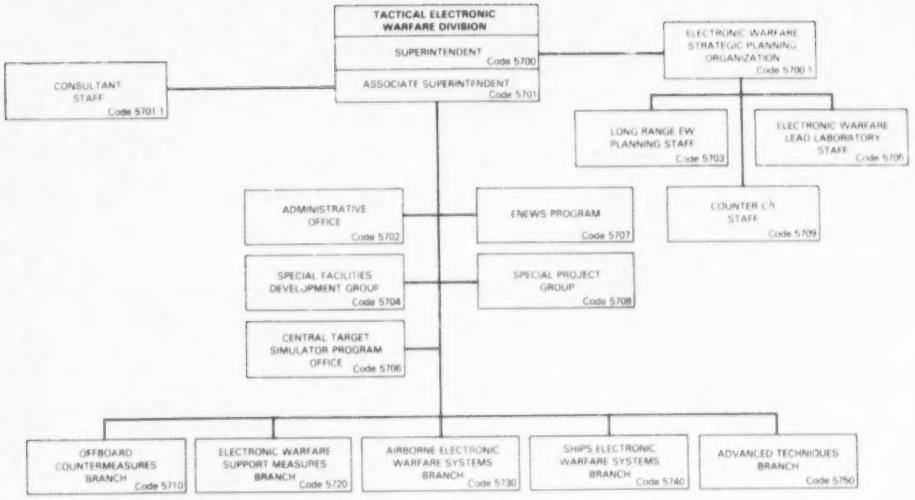
Millimeter-Wave Upconverter Receiver


F-27

Active Expendable Decoy

Dr. G. P. Ohman

F-70


TACTICAL ELECTRONIC WARFARE DIVISION
SUPERINTENDENT Code 5700
ASSOCIATE SUPERINTENDENT Code 5701
CONSULTANT STAFF Code 5701.1
ELECTRONIC WARFARE STRATEGIC PLANNING ORGANIZATION Code 5700.1
LONG RANGE EW PLANNING STAFF Code 5703
ELECTRONIC WARFARE LEAD LABORATORY STAFF Code 5705
ADMINISTRATIVE OFFICE Code 5702
ENEWS PROGRAM Code 5707
COUNTER C³I STAFF Code 5709
SPECIAL FACILITIES DEVELOPMENT GROUP Code 5704
SPECIAL PROJECT GROUP Code 5708
CENTRAL TARGET SIMULATOR PROGRAM OFFICE Code 5706
OFFBOARD COUNTERMEASURES BRANCH Code 5710
ELECTRONIC WARFARE SUPPORT MEASURES BRANCH Code 5720
AIRBORNE ELECTRONIC WARFARE SYSTEMS BRANCH Code 5730
SHIPS ELECTRONIC WARFARE SYSTEMS BRANCH Code 5740
ADVANCED TECHNIQUES BRANCH Code 5750

Basic Responsibilities

The Tactical Electronic Warfare Division is responsible for research and development in support of the Navy's tactical electronic warfare requirements and missions. These include electronic warfare support measures, electronic countermeasures, and supporting counter-countermeasures, as well as studies, analyses, and simulations for the determination and improvements of the effectiveness of these systems.

Key Personnel

Name	Title
Dr. G.P. Ohman*	Superintendent
Dr. G.P. Ohman	Associate Superintendent
Dr. G.P. Ohman†	Head, Consultant Staff
Mrs. C. Rulapaugh	Administrative Officer
Mr. G. Meades	Division DILO
Dr. J.A. Montgomery†	Head, Long-Range EW Planning Staff
Mr. H.M. Suski	Head, Special Facilities Development Group
Mr. R.L. Aberg	Head, Electronic Warfare Lead Laboratory Staff
Mr. A.A. Di Mattesa	Manager, Central Target Simulator Program
Mr. D.F. Grady	Manager, ENEWS Program
Mr. N.J. Lesko	Manager, Special Project Group
Mr. L.O. Sweet	Head, Counter-C^3 I Staff
Dr. J.A. Montgomery	Head, Offboard Countermeasures Branch
Mr. H.W. Zwack	Head, Electronic Warfare Support Measures Branch
Mr. E.E. Koos	Head, Airborne Electronic Warfare Systems Branch
Mr. H.E. Crecraft	Head, Ships Electronic Warfare Systems Branch
Dr. G.E. Friedman	Head, Advanced Techniques Branch

Personnel

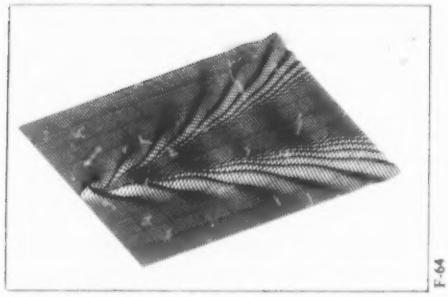
Full-time civilian: 188

R&D Budget

FY 1985: $35,688,000

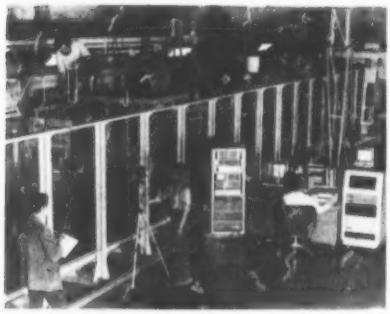
*Acting
†Additional duty

Marine Technology Division



F-64

Computer-Generated Simulated Kelvin Wake



F-71

Wind-Wave Tank

F-72

Ocean Fine-Scale Variability Experiments

F-73

Optical Visualization of Impact-Generated Rayleigh Wave

Staff Activities

Shock and Vibration Information Center

Research Activity Areas

Fluid Dynamics

- Fluid-structure interactions
- Flow-generated noise studies
- Boundary layer hydrodynamics
- Wake hydrodynamics

Structural Integrity

- Failure mechanisms in advanced structural materials
- Reliability analysis and failure modes of components and systems
- Advanced techniques for nondestructive evaluation
- Ship and submarine shock protection
- Component response to shock and vibration

Marine Systems

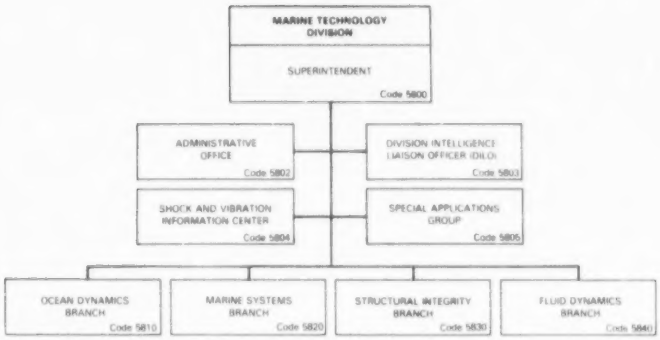
- Autonomous vehicle development
- Vehicle stability, control, and navigation
- Sensor research and development
- Adaptive sensor and control systems

Ocean Dynamics

- Mesoscale, fine-structure, microstructure variability
- Mixed layer and thermocline applications
- Ocean towed instrumentation techniques

Dr. R. T. Swim

E-74



Basic Responsibilities

The Marine Technology Division conducts research and development programs to provide the technology base for marine engineering. The goal is to establish principles and systematic procedures for the design of marine systems and structures and for the performance of marine operations. In the Staff Activities, the Shock and Vibration Information Center provides services for engineers nationwide.

Key Personnel

Name	Title
Dr. R.T. Swim	Superintendent
Mrs. E.M. Coates	Administrative Officer
Dr. J.G. Showalter*	Head, Shock and Vibration Information Center
Mr. E.E. Rudd	Head, Ocean Dynamics Branch
Mr. H.A. Johnson	Head, Marine Systems Branch
Dr. C.I. Chang	Head, Structural Integrity Branch
Dr. R.A. Skop	Head, Fluid Dynamics Branch

Personnel

Full-time civilian: 87
Military: 49

R&D Budget

FY 1985: $11,503,000

*Acting

Underwater Sound Reference Detachment

Research Activity Areas

Measurements
- Calibration theory and accuracy
- Measurement methods
- Standard calibration services
- Sonar transducer test and evaluation
- Transduction and radiation theory
- Wave-number calibration
- Shock testing

Acoustical Systems
- Computation services
- Digital systems
- Analog systems
- Signal analysis
- Low noise preamplifiers
- Measurement systems

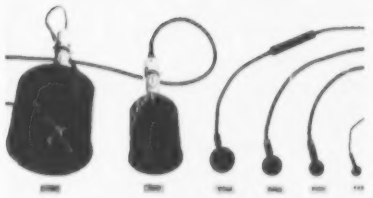
Transducer
- Acoustic materials
- Acoustic material measurements
- Electroacoustic standards
- Acoustic sources
- Specialized electroacoustic transducers
- Standard loan services
- Transduction
- Transducer reliability
- Sonar transducers
- Accelerated life testing

F-75

Leesburg Facility-
Calibration Range

F-76

Underwater Sound Reference Detachment
(USRD) Orlando, Florida



F-77

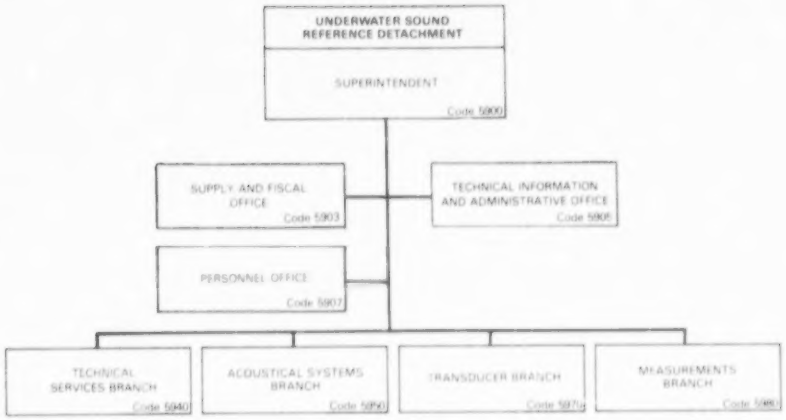
USRD Standard Transducer

F-78

Constant Beamwidth
Transducer

F-142

Dr. J. E. Blue



Basic Responsibilities

The Underwater Sound Reference Detachment is the focal point in the Navy for standardization in the science and technology of underwater sound measurements. Its research and development program is aimed at expanding the state of the art and providing Navy in-house expertise. Reference calibration measurements in a large complex of specialized facilities and calibrated standard transducers are available to all naval activities and contractors in support of undersea warfare programs. The Detachment also provides expertise in nonlinear acoustics, nearfield arrays and measurements, radiation theory, and underwater electroacoustic sensors.

Key Personnel

Name	Title
Dr. J.E. Blue	Superintendent
Mr. H.F. Bowman	Head, Supply and Fiscal Office
Ms. D.A. Pieper	Head, Technical Information and Administrative Office
Ms. M.S. Lutman	Head, Personnel Office
Mr. G. Woods	Head, Technical Services Branch
Mr. J.D. George	Head, Acoustical Systems Branch
Dr. R.W. Timme	Head, Transducer Branch
Dr. A.L. Van Buren	Head, Measurements Branch

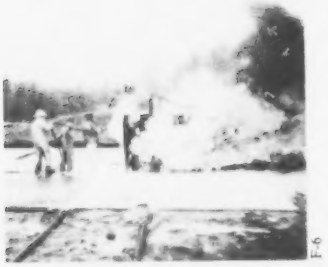
Personnel	R&D Budget
Full-time civilian: 92	FY 1985: $8,717,700

Material Science and Component Technology Directorate

Material Science and Component Technology Directorate

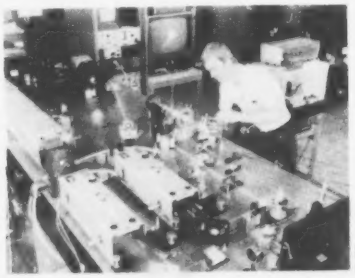
The Material Science and Component Technology Directorate carries out a multidisciplinary research program whose objectives are the development of new improved materials, the generation of new concepts associated with materials behavior, and the development of advanced components based on these new and improved materials and concepts. Theoretical and experimental research is carried out to determine the origins of materials behavior and to develop procedures for modifying these materials to meet important Navy needs such as fire suppression. The program includes investigations of a broad spectrum of materials including insulators, semiconductors, metals and alloys, optical materials, polymers, plastics, and composites which are used in important naval devices, components, and systems. New techniques are developed for producing, processing, and fabricating these materials for important naval applications.

The limits of performance of these materials and components under deleterious conditions such as those associated with the marine environment, neutron or directed energy beam irradiation, or extreme temperatures and pressures, are established.



F-6

Chemistry for Fire Suppression

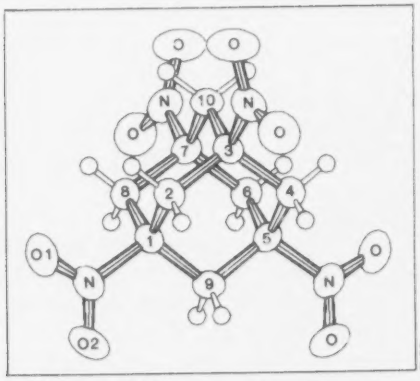


F-79

Optical Physics—
Scanning Laser Microscope

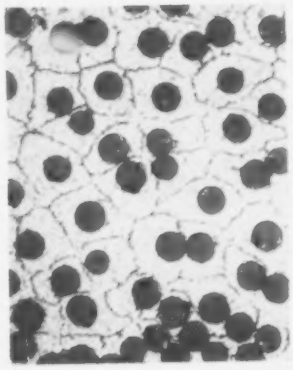
F-31

Microelectronics Processing—
Electron Beam Lithography



F-80

Structure of Matter—Propellants Research



F-81

Material Science—
Graphite Fibers in Aluminum

Associate Director of Research for Material Science and Component Technology

F-82

Dr. Albert I. Schindler

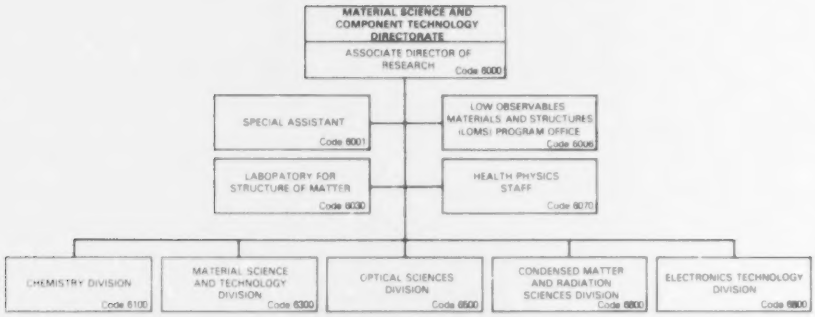
Dr. Schindler was born in Pittsburgh, Pennsylvania, on June 24, 1927. He received the degrees of B.S. (1947), M.S. (1948), and D.Sc. (1950), all in physics, from Carnegie Institute of Technology.

He began his career at the Naval Research Laboratory in 1951, and as Head, Metal Physics Branch, Metallurgy Division, conducted and directed research on the physical properties of metallic alloys. Dr. Schindler has authored or coauthored over 90 papers in solid state physics on topics including electron transport properties and galvanomagnetic effects in alloys, electronic specific heat of transition metals, and irradiation effects in magnetic materials. In this latter area, he holds several patents. He has been an Adjunct Professor of Physics at Howard University, and has supervised thesis research there as well as at Catholic University, the University of Maryland, and American University. During a sabbatical year, Dr. Schindler was a visiting scientist at Imperial College of Science and Technology in London, England.

Dr. Schindler has served with distinction on many governmental science advisory boards and study groups, including the Naval Studies Board, The Technical Cooperation Program (Materials Performance Panel, P-4), the National Research Council's Major Materials Facilities Committee, and the Solid State Sciences Committee.

For his distinguished research, Dr. Schindler has received numerous awards, including the E.O. Hulburt Award presented in 1956, 1966 Award for Scientific Achievement presented by the Washington Academy of Sciences, and the Navy Award for Distinguished Achievement in Science (1975). In 1982 he received the rank of Meritorious Executive in the Senior Executive Service.

Dr. Schindler is a Fellow of the American Physical Society and of the Washington Academy of Sciences. He also is a member of the Philosophical Society of Washington and of Sigma Xi, for which he served as a member of the Board of Directors from 1974 to 1976.



Key Personnel

Name	Title	Code
Dr. A.I. Schindler	Associate Director of Research for Material Science and Component Technology	6000
Mr. R. Nekritz	Special Assistant	6001
Dr. B.J. Faraday	Program Manager, Project LOMS	6006
Dr. J. Karle	Chief Scientist, Laboratory for Structure of Matter	6030
Mr. J.N. Stone	Head, Health Physics Staff	6070
Dr. W.M. Tolles	Superintendent, Chemistry Division	6100
Dr. B.B. Rath	Superintendent, Material Science and Technology Division	6300
Dr. T.G. Giallorenzi	Superintendent, Optical Sciences Division	6500
Dr. J.B. Aviles, Jr.*	Superintendent, Condensed Matter and Radiation Sciences Division	6600
Dr. G.M. Borsuk	Superintendent, Electronics Technology Division	6800

*Acting

Laboratory for Structure of Matter
(Code 6030)

Basic Responsibilities

The Laboratory for Structure of Matter carries out experimental and theoretical investigations of the atomic, molecular, glassy, and crystalline structures of materials. The methods of x-ray, electron, and neutron diffraction are used in a broad program of structural studies which can form the basis for understanding and interpreting the results of research investigations in a wide variety of scientific disciplines. Structural investigations relate structure to function, facilitate industrial syntheses and the creation of new materials with improved properties, and provide foundation information for numerous associated disciplines and studies. Applications are made, for example, to propellants, explosives, dense energetic materials, absorptive carbons, metallic glasses, device materials, ion carriers, antibiotics, analgesics, reversible oxygen carriers, and synthetic reaction intermediates and final products.

Dr. J. Karle

Key Personnel

Name	Title
Dr. J. Karle	Chief Scientist, Laboratory for Structure of Matter

Personnel	R&D Budget
Full-time civilian: 11	FY 1985: $976,000

Health Physics Staff
(Code 6070)

Basic Responsibilities

The Health Physics Staff provides a Laboratory-wide protection program for the possession and use of all sources of ionizing and microwave radiation. The staff performs technical monitoring, evaluation, and research to assure that NRL radiological and microwave operations are safe and in compliance with federal, state, and Navy regulations. It provides employees with training, instructions, instruments, assistance, and controls needed to carry out their radiological and microwave safety responsibilities.

F-84

Mr. J. N. Stone

Key Personnel

Name	Title
Mr. J.N. Stone	Head, Health Physics Staff
Mr. T.L. Johnson	Head, Research & Technical Support Section
Mr. R.B. Luersen	Head, Survey & Analysis Section

Personnel

Full-time civilian: 14

R&D Budget

FY 1985: $50,000

Chemistry Division

Staff Activity

Fire Protection and Damage Control
Program Office

Research Activity Areas

Chemical Diagnostics
- Optical diagnostics of chemical reactions
- Kinetics of gas phase reactions
- Chemical lasers and energy transfer
- Trace analysis
- Atmosphere analysis and control

Polymeric Materials
- Synthesis and evaluation of innovative polymers
- Functional organic coatings
- Polymer characterization
- Nondestructive evaluation
- Quality control methodology
- Degradation and stabilization mechanisms
- Electroactive polymers
- Synthesis and characterization of novel inorganic compounds
- High temperature chemistry
- Theoretical chemistry

Surface/Interface Chemistry
- Tribology
- Surface properties of materials
- Surface/interface analysis
- Graphite and carbon materials
- Chemical microdetectors
- IR/RF decoy materials

Inorganic & Electrochemistry (cont'd)
- Surface modification
- Beam enhanced chemistry
- Fundamental electrode reactions
- Corrosion prevention
- High temperature chemistry
- Tetero- and homogeneous catalysis

Combustion & Fuels
- Distillate fuels research
- Combusiton dynamics
- Fire protection and suppression
- Personnel protection
- Modeling and scaling of combustion systems
- Chemical and biological defense
- Synthetic fuels

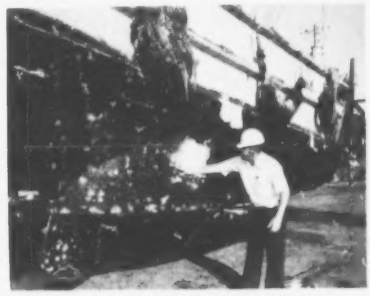
Bio/Molecular Engineering
- Biophysical chemistry
- Immunochemistry
- Biomembranes
- Lipid and protein structure
- Molecular graphics
- Biosensors
- Polymerizable lipids
- Langmuir-Blodgett films
- Red blood cell surrogate

F-85

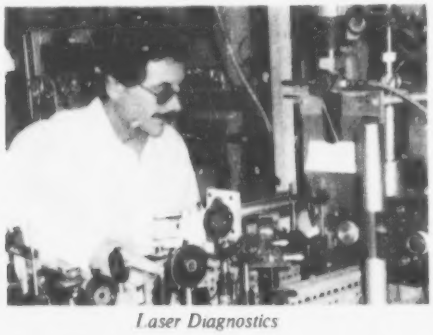
Impact of Fires in Enclosed Spaces— NRL's 324 cu. m. Facility

F-5

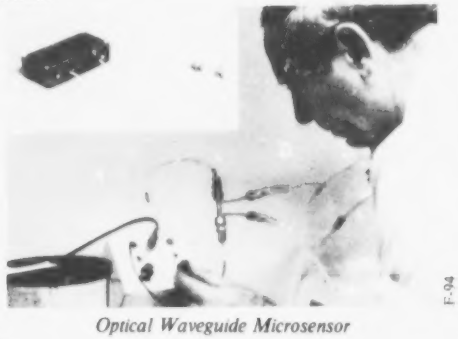
Studying Red Blood Cell Surrogate in the Cold Room


F-86

Fouling Release Coatings


F-93

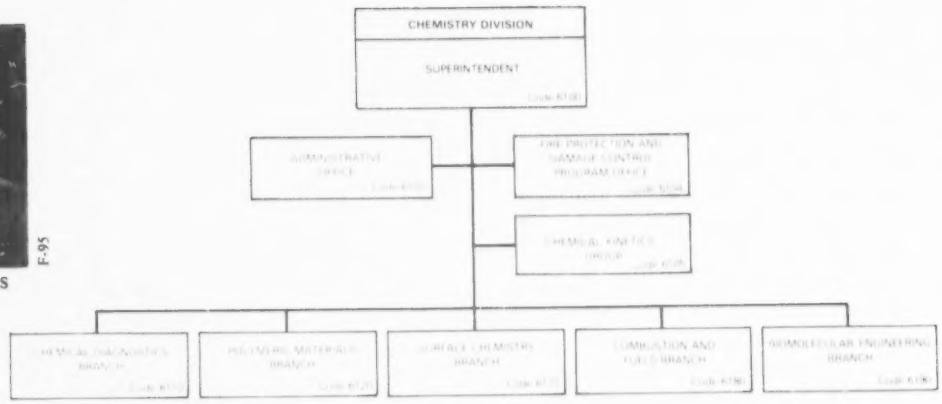
Laser Diagnostics


F-94

Optical Waveguide Microsensor

Dr. W. M. Tolles

F-95



Basic Responsibilities

The Chemistry Division conducts basic and applied research and development studies in the broad fields of chemical diagnostics, polymeric materials, surface and electrochemistry, bio/molecular engineering, combustion, and fuels chemistry. Specialized programs within these fields include organic polymeric materials, coatings, dynamics, laser chemistry, electroactive polymers, tribology, physical and chemical characterization of surfaces and theory of surfaces, chemistry of electronic materials, submarine atmosphere analysis and control, lipid chemistry, membranes and novel structures, sensors, solution chemistry, personnel protection (including chemical and biological defenses), fire suppression, and the chemistry and physics of synfuels.

Key Personnel

Name	Title
Dr. W.M. Tolles	Superintendent
Dr. W.B. Fox	Associate Superintendent
Ms. B.L. Russell	Administrative Officer
Dr. H.W. Carhart	Head, Fire Protection and Damage Control Program Office
Dr. A.B. Harvey	Head, Chemical Diagnostics Branch
Dr. W.B. Moniz	Head, Polymeric Materials Branch
Dr. J.S. Murday	Head, Surface Chemistry Branch
Dr. H.W. Carhart	Head, Combustion and Fuels Branch
Dr. J. Schnur	Head, Bio/Molecular Engineering Branch

Personnel

Full-time civilian: 112

R&D Budget

FY 1985: $20,707,000

Material Science and Technology Division

Staff Activity

Laser Materials-Application Center
Failure Analysis and Fractography Staff

Research Activity Areas

Environmental Effects
- Microstructural characterization
- Weldability of advanced alloys
- Thermomechanical effects
- Micromechanisms of crack growth
- Novel fabrication and processing
- Corrosion science of advanced alloys
- Stress corrosion cracking
- Surface protection and inhibitors
- Corrosion mechanisms
- Marine corrosion and cathodic protection

Physical Metallurgy
- Phase transformations
- Crystalline defect states
- Microstructural effects on properties
- Elasticity, plasticity, mechanical phenomena
- Laser welding
- Alloy development
- Laser surface processing
- Ion implantation
- Small angle neutron scattering
- Rapid solidification processing of materials

Mechanics of Materials
- Subcritical crack growth and fracture
- Environmental effects
- Failure-safe design parameters
- Metallurgical optimization for high-strength metals
- Failure criteria
- Computational mechanics
- Fracture mechanics
- Structural mechanics

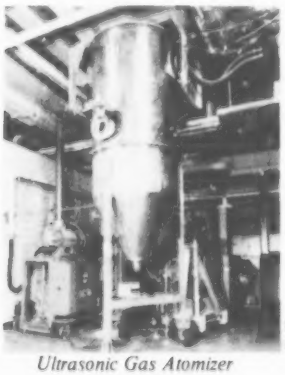
Composite Materials
- Physical, mechanical, and failure characterizations
- Fabrication and processing techniques
- Mechanical and failure analyses
- High-temperature structural and ordnance applications

Ceramics
- Processing and fabrication
- Microstructural characterization
- Strength and fracture behavior
- Thermostructural applications
- Ceramics for electronic, piezo-electric, optical, and other nonmechanical applications

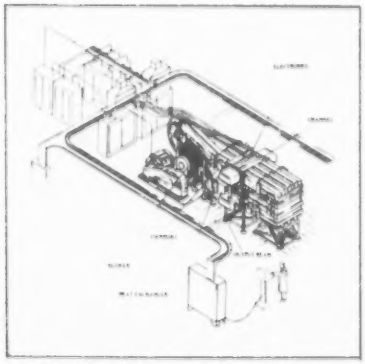
Thermostructural Materials
- Elevated temperature behavior of materials
- Influence of environment on high-temperature materials
- Basic mechanisms of radiation damage
- Criteria for improved structural design using high-temperature materials

F-10

Scanning Electron Microscope and Microprobe Analyzer


F-97

Ultrasonic Gas Atomizer

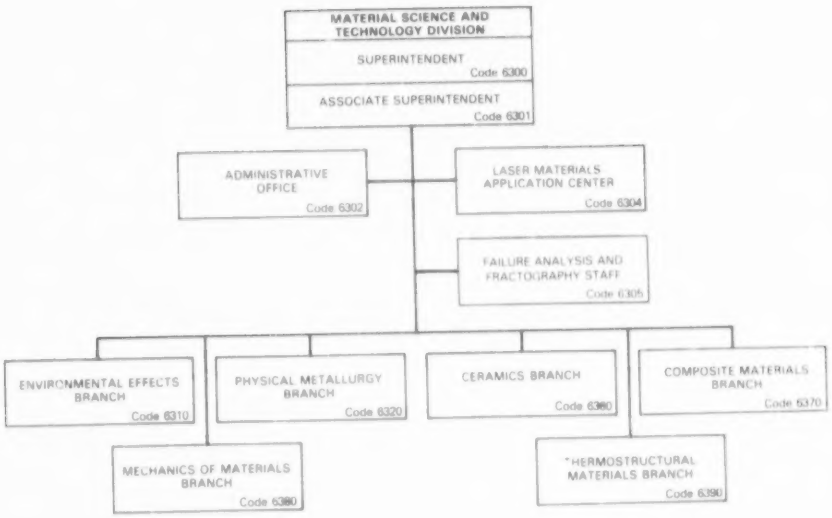

F-96

Laser Materials-Application Center

F-9

Hot Isostatic Pressing of Materials

Dr. B. B. Rath



Basic Responsibilities

The Material Science and Technology Division conducts basic and applied research and engages in exploratory and advanced development of materials technology having substantive value to the Navy. R&D programs encompass the intrinsic behavior of metals, alloys, ceramics, glasses, and composites; the fabrication of naval structures and devices from these materials; and the effects of projected military service environment on the performance and reliability of these materials. Program objectives include achieving fundamental understanding of the mechanical and physical properties of materials; identifying composition, processing, and microstructural factors to produce improved materials; and developing criteria for the selection, design, certification, and life-cycle management of materials in naval vehicles and systems. This diversity of programs is carried out by interdisciplinary teams of material scientists, metallurgists, ceramists, physicists, chemists, and engineers, using the most advanced testing facilities and diagnostic techniques.

Key Personnel

Name	Title
Dr. B.B. Rath	Superintendent
Mr. R.J. Goode	Associate Superintendent
Mrs. E. Wray	Administrative Officer
Mr. R.L. Stegman	Head, Laser Materials-Application Center
Mr. C.D. Beachem	Head, Failure and Fractography Analysis Staff
Dr. A.J. Sedricks	Head, Environmental Effects Branch
Mr. R.W. Judy, Jr.*	Head, Physical Metallurgy Branch
Mr. Dr. D. Lewis III*	Head, Ceramics Branch
Dr. S.C. Sanday	Head, Composite Materials Branch
Dr. R. Badaliance	Head, Mechanics of Materials Branch
Mr. L.E. Steele	Head, Thermostructural Materials Branch

Personnel

Full-time civilian: 92

R&D Budget

FY 1985: $11,394,000

*Acting

Optical Sciences Division

Staff Activities

Program analysis and development
Special systems analysis
Technical study groups
Technical contract monitoring
Theoretical studies

Research Activity Areas

Optical Probes
- Laser-matter interactions
- Photophysical processes
- Nonlinear optical phenomena
- Electronic properties of materials
- Optical instrumentation
- Synchrotron radiation
- Interferometry

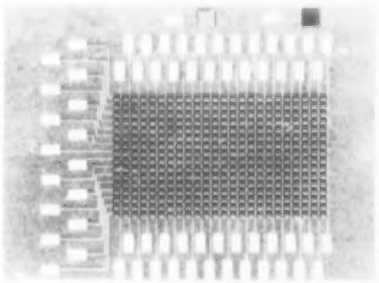
Advanced Concepts
- IR low observables
- IR space surveillance systems
- EO/IR systems analysis
- Airborne IR search and track technology
- Atmospheric IR measurements
- Ship IR signatures

Applied Optics
- Optical image and information processing
- Optical technology
- Ultraviolet component development and UV countermeasures
- Atmospheric optics
- Propagation studies

Laser Physics
- Molecular and chemical laser physics
- Laser chemical kinetics
- Electrically driven lasers
- Laser-induced reactions
- Laser materials diagnostics
- Nonlinear frequency conversion
- Beam cleanup technology

Electro-optical Technology
- Optical and IR countermeasures
- Detection signal processing studies
- Optical seeker studies
- Solid state laser development
- Optical imager development
- Optical interactions in semiconductor systems

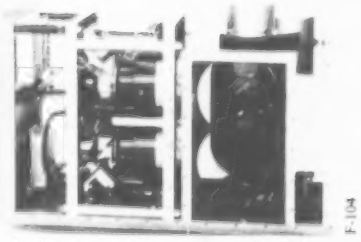
Optical Techniques
- Picosecond light pulses
- Nonlinear effects in materials
- Optical waveguides
- Radiation-induced defects
- Optical properties: fibers, windows, data processing materials
- Optical control of solid state electronic devices
- Fiberoptic sensors


F-99

Focal Plane Array

F-100

High Precision Tracker and Trailer


F-104

IR Background Measurement Sensor

F-101

Fiber Draw Facility

F-102

Twin Pulsed Chemical Lasers

Dr. T.G. Giallorenzi

Basic Responsibilities

The Optical Sciences Division carries out a variety of research, development, and application-oriented activities in the generation, propagation, detection, and use of radiation in the wavelength region between near-ultraviolet and far-infrared wavelengths. The research, both theoretical and experimental, is concerned with discovering and understanding the basic physical principles and mechanisms involved in optical devices, materials, and phenomena. The development effort is aimed at extending this understanding in the direction of device engineering and advanced operational techniques. The applications activities include systems analysis, prototype system development, and exploitation of R&D results for the solution of optically related military problems. In addition to its internal program activities, the Division serves the Laboratory specifically and the Navy generally as a consulting body of experts in optical sciences. The work in the Division includes studies in quantum optics, laser physics, optical waveguide technologies, laser-matter interactions, atmospheric propagation, optical technology, holography, optical warfare, optical data processing, optical systems, optical materials, radiation damage studies, IR surveillance and missile seeker technologies, IR signature measurements, optical recording materials, and optical diagnostic techniques. A significant portion of the effort is devoted to developing, analyzing, and using special optical materials. Various field measurement programs on optical problems of specific interest are also conducted.

Key Personnel

Name	Title
Dr. T.G. Giallorenzi	Superintendent
Mr. J.M. McMahon	Associate Superintendent
Mrs. D.D. Nolan	Administrative Officer
Dr. J.C. Kershenstein	Program Analysis & Development Staff
Mr. J.M. McMahon	Program Analysis & Development Staff
Dr. R.A. Patten	Program Analysis & Development Staff
Dr. D.L. Esterowitz	Program Analysis & Development Staff
Mr. J.E. Donovan	Head, Fiber Optics Technology Program Office
Dr. M.N. Kabler	Head, Optical Probes Branch
Dr. J.C. Kershenstein	Head, Advanced Concepts Branch
Dr. R.A. Patten	Head, Applied Optics Branch
Dr. B. Feldman	Head, Laser Physics Branch
Dr. L. Esterowitz	Head, Electrooptical Technology Branch
Dr. H. Taylor	Head, Optical Techniques Branch

Personnel

Full-time civilian: 131

R&D Budget

FY 1985: $23,963,000

Condensed Matter and Radiation Sciences Division

Research Activity Areas

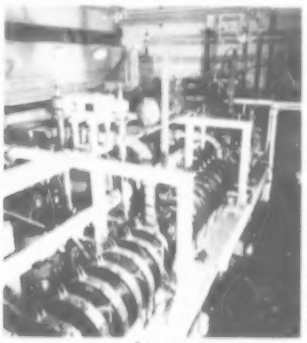
Radiation Survivability & Detection
- Radiation detection
- Space radiation belts
- Ionizing and laser radiation degradation/damage
- Hardening of components
- Radiation damage/degradation
- Device testing in radiation beams
- 60 MeV electron linac
- 2 MV electron Van de Graaff
- Cobalt-60 radiation source

Metal Physics
- Electronic and transport properties
- Magnetic/materials
- Multilayer structures
- Thin film science
- Superconductivity
- Nonlinear dynamics

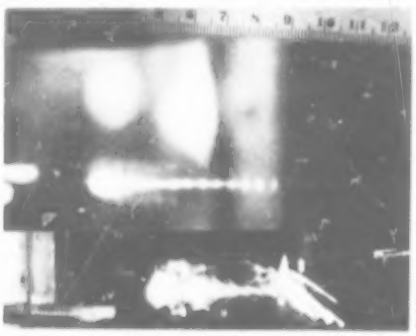
Condensed Matter Physics
- X-ray sources, optics, and detectors
- X-ray analysis of materials
- Plasma spectroscopy
- Synchrotron radiation applications
- Phase transformations
- X-ray lithography
- Radiation effects in microelectronics
- Condensed matter theory

Radiation-Matter Interactions
- Interaction of particle beams with materials
- Radiation transport calculations
- Energetic radiation applications
- Molecular collisions
- Interaction of intense EM radiation with materials
- Radiation curing of polymers
- Hypervelocity impact

Materials Modification and Analysis
- Surface analysis by ion beam techniques
- Radiation effects from high-energy charged-particle beams
- Crystal studies by channeling techniques
- Modification of surfaces by ion implantation
- Sputtering by high-energy ions
- Theory of ion-solid interactions
- 5-MV Van de Graaff
- Two 200-kV ion implantation systems


F-105

Linac


F-107

Plasma Generated by 8mm Gyrotron Radiation

F-106

Ion Beam Implanter

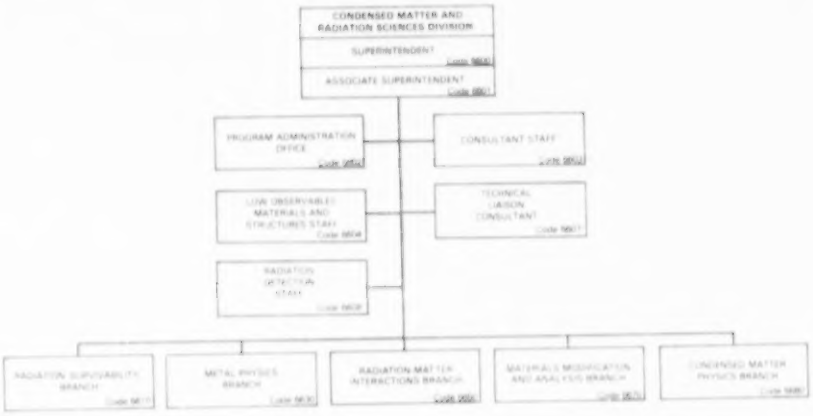
Staff Activities

- Radiation effects studies
- Ion-solid interactions
- Radiation theory
- X-ray optics

F-108

Sputtering Facility

Dr. J. B. Aviles, Jr.



Basic Responsibilities

The Condensed Matter and Radiation Sciences Division conducts a broad program of basic and applied research on the fundamental properties of materials and on the interactions of various types of radiation with matter. Physical properties of matter, including pure metals, alloys, crystals, semiconductors, superconductors, magnetic materials, lower dimensional materials, liquids, and plasmas, are investigated theoretically and experimentally as well as by various radiation probes. Damage produced by radiation, ranging from laser and x-ray beams through charged and neutral particle beams in the megavolt region, is studied. Techniques to utilize radiation for beneficial modification of materials are also developed. Radiations of military significance are studied and simulated in the laboratory by various radiation facilities maintained and operated by the Division primarily for DoD users.

Key Personnel

Name	Title
Dr. J.B. Aviles, Jr.*	Superintendent
Vacancy	Associate Superintendent
Mr. D.F. France	Head, Program Administration Office
Dr. A.W. Saenz	Consultant (Radiation Theory)
Dr. J.W. Butler	Consultant (Ion Beam Applications)
Dr. B.J. Faraday	Program Manager, Project LOMS Program Office
Mr. S.J. Babjak	Technical Liaison Consultant
Mr. J.C. Ritter	Head, Radiation Survivability and Detection Branch
Dr. D.U. Gubser	Head, Metal Physics Branch
Dr. A. Stolovy	Head, Radiation-Matter Interaction Branch
Dr. F.A. Smidt	Head, Materials Modification and Analysis Branch
Dr. D.J. Nagel	Head, Condensed Matter Physics Branch

Personnel	R&D Budget
Full-time civilian: 115	FY 1985: $18,497,900

*Acting

Electronics Technology Division

Research Activity Areas

Semiconductors
- Solid state theory
- Electrical and optical characterization of materials
- Microstructures
- Impurity and defect studies
- Structural and electronic properties of amorphous semiconductors
- Electrical, optical, and magneto-optical studies of semiconductor surfaces and interfaces

Surface Physics
- Surface and interface physics
- Cathode research and development
- Processing research for submicron electronics
- Characterization and growth of semiconductor, metal, and insulator films and surfaces
- Thermionic energy conversion

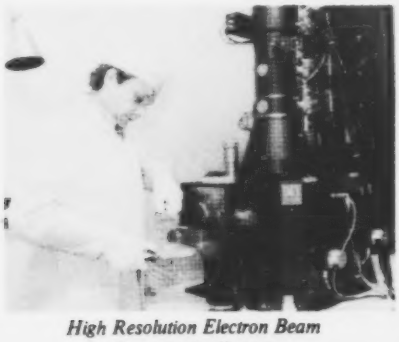
Surface Physics (cont'd)
- Field emission arrays

Microwave Technology
- Surface acoustic waves
- Microwave and millimeter-wave integrated circuits
- Microwave solid state sources
- Microwave ferrimagnetic and ferromagnetic components
- Millimeter-wave and submillimeter-wave device research
- Superconducting devices and circuits

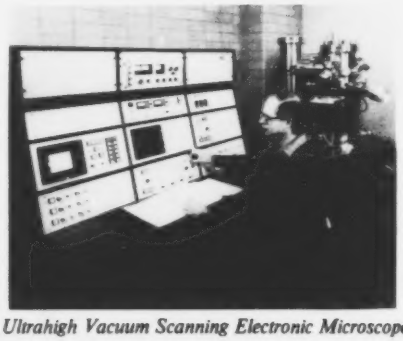
Solid State Devices
- Ion implantation technology
- High- and low-power devices for energy conversion
- Field effect transistor reliability and failure analysis
- MIS failure physics, radiation vulnerability and hardening
- High-frequency microwave devices
- IC device technology
- Solid state optical sensors

Electronic Material Technology
- Preparation and development of magnetic, dielectric, optic, and semiconductor materials
- Optical components and coatings
- Molecular beam epitaxy
- Metal organic chemical vapor deposition

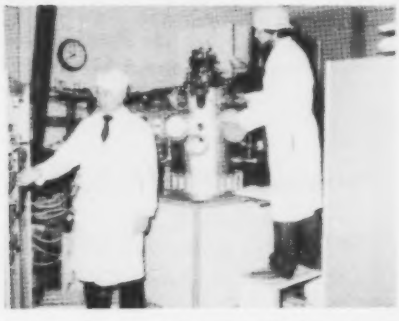
Microwave and Millimeter Wave Tube Technology
- Microwave and millimeter power amplifier research and development
- Amplifier theory and analysis
- Supportive technology development
- Tube fabrication and support technology
- Manufacturing technology


F-109

High Resolution Electron Beam Lithography System


F-110

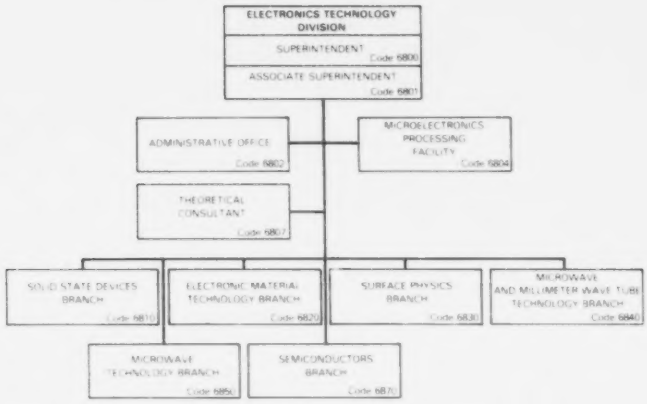
Ultrahigh Vacuum Scanning Electronic Microscope


F-111

Molecular Beam III-V Compound Epitaxy System

F-112

Dr. G. M. Borsuk



Basic Responsibilities

The Electronics Technology Division conducts programs of basic and applied research and development in the fields of electronic properties of solid materials (especially semiconductors), materials, surface physics, microwave techniques, microelectronic devices research and fabrication, highpower microwave generation, and cryoelectronics. These programs represent major activity in microstructure electronics, microelectronics, materials growth, vacuum electronics, and components and circuits. The activities of the Division couple device research both to basic materials investigations and to systems research and development needs.

Key Personnel

Name	Title
Dr. G.M. Borsuk	Superintendent
Dr. S. Teitler	Associate Superintendent
Mrs. A. McDaniel	Administrative Office
Dr. K.L. Ngai	Theory Consultant
Dr. M.C. Peckerar	Head, Microelectronics Processing Facility
Dr. J.M. Killiany	Head, Solid State Devices Branch
Mr. H. Lessoff	Head, Electronic Material Technology Branch
Dr. R.F. Greene	Head, Surface Physics Branch
Dr. R.K. Parker	Head, Microwave and Millimeter Wave Tube Technology Branch
Dr. B.E. Spielman	Head, Microwave Technology Branch
Dr. S.G. Bishop	Head, Semiconductors Branch

Personnel

Full-time civilian: 124

R&D Budget

FY 1985: $19,474,000

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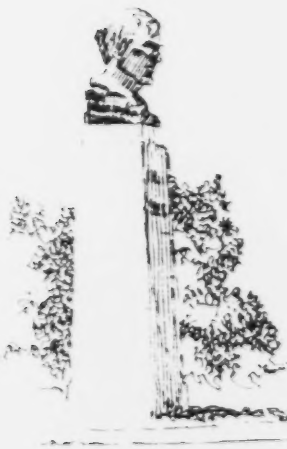
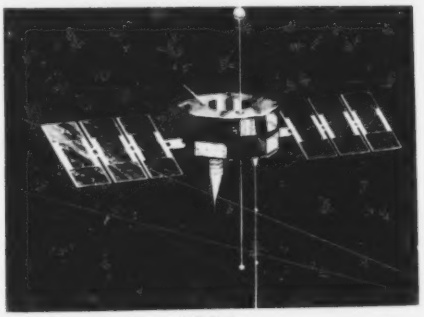


Space and Communications
Technology Directorate

Space and Communications Technology Directorate

This directorate conducts basic and applied research to improve naval capabilities in communications, navigation, detection, surveillance, environmental sensing, and combat management. It also is responsible for research and development in the systems, sensors, techniques, instrumentation, and phenomenology of communications, command and control, signal exploitation, and information processing. Work in these fields is supported by theoretical studies and analyses, as well as by experimental development and flight of payloads. Special facilities for building and testing complete spacecraft are available for on-orbit evaluation of space concepts and techniques.

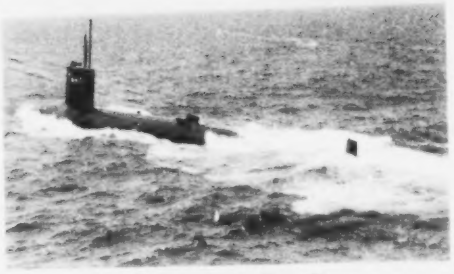


F-112

NTS-2

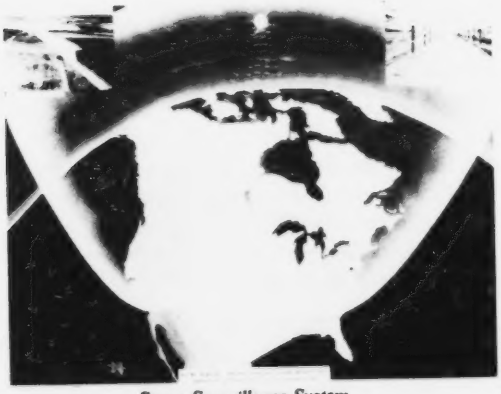
F-114

Waldorf Antenna Site



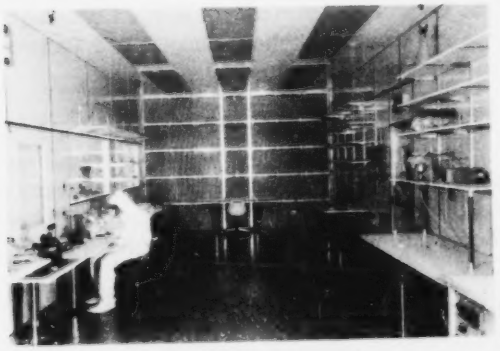
F-115

Communication Buoy Test



F-116

Space Surveillance System



F-117

Satellite Component Assembly Clean Room

Associate Director of Research for Space and Communications Technology

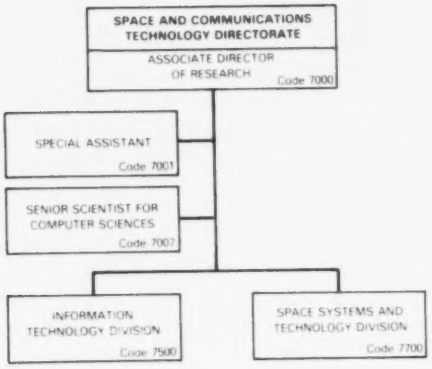
Dr. B. Wald

Dr. Wald was born in New York City on June 22, 1934. He received the degree of A.B. in physics from Bowdoin College in 1953, and of Ph.D. in electrical engineering from the University of Maryland in 1967.

He came to the Countermeasures Branch of the Radio Division of the Naval Research Laboratory in 1953, where he developed intercept receivers and computers for simulating their performance. From 1957 to 1962, he led a group exploring the application of digital technology to direction finding and signal intercept. From 1962 to 1967, he was in charge of the development of the automation of the Bulls Eye target location system.

In 1967, he founded the Information Systems Branch, NRL's first computer science activity. In 1972, he became Superintendent of the Communications Sciences Division, and became acting Director of Space and Communications Science and Technology in 1979. He was appointed to his present position on January 1, 1980.

Dr. Wald is a member of the Institute of Electrical and Electronic Engineers and the Association for Computing Machinery and has served these societies in editorial, conference organization, and refereeing roles. He has taught for the University of Maryland and the George Washington University and has lectured at the Naval War College. He has served as an associate member of the Defense Science Board and was twice awarded the Navy's Meritorious Civilian Service Award.



Key Personnel

Name	Title	Code
Dr. B. Wald	Associate Director of Research for Space and Communications Technology	7000
Vacant	Special Assistant	7001
Mr. Y. S. Wu	Senior Scientist	7007
Dr. J.R. Davis	Superintendent, Information Technology Division	7500
Mr. P.G. Wilhelm	Superintendent, Space Systems and Technology Division	7700

Information Technology Division

Research Activity Areas

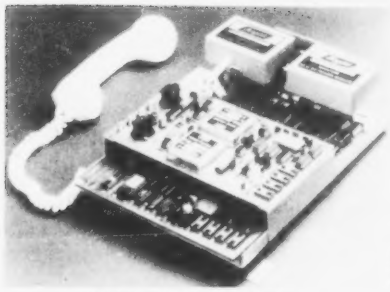
Navy Center for Applied Research in Artificial Intelligence
- Natural Language for Automated Message Processing
- Multisensor Information Integration
- Expert Systems for Decision Aids and Consultation

Communication System Engineering
- Network design
- Secure communication systems
- Speech processing
- Modulation, coding, and waveform design

Transmission Technology
- Submarine communication technology
- Communication system architecture
- Communication antenna/propagation technology
- Satellite communication system technology

Integrated Warfare Technology
- Combat management information system analyses
- Command information system design
- Communication, command, and control countermeasures
- Signal processing for high-frequency intercept system

Computer Science and Systems
- Software engineering
- Information theory
- Message processing technology



F-119

Multirate Processor Digital Voice Terminal

F-120

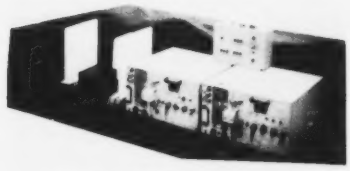
Artificial Intelligence Center

F-121

Microwave Space Research Facility

F-122

HF Wideband Monopole Transmitting Antenna

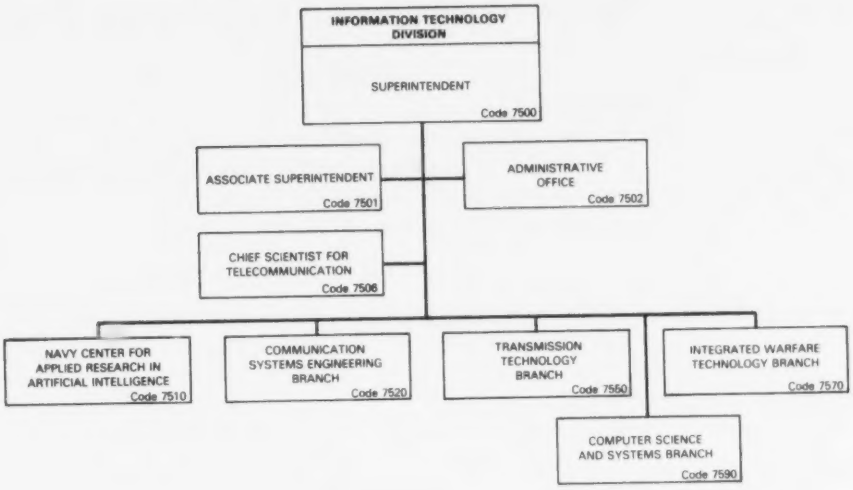


F-123

AN/ALQ-149 Communication Jammer

F-167

Dr. J.R. Davis



Basic Responsibilities

The Information Technology Division conducts research and development programs in the collection, transmission, and processing of information in order to provide a basis for improvement in the conduct of military operations. The organization of the Division is directed toward addressing the technologies and subsystems necessary to support a combat management information system.

Key Personnel

Name	Title
Dr. J.R. Davis	Superintendent
Mr. W.D. Long	Associate Superintendent
Mrs. C.E. Holt	Administrative Officer
Mr. D.I. Himes	Chief Scientist for Telecommunication
Vacancy	Manager, Navy Center for Applied Research in Artificial Intelligence
Mr. E.L. Kline	Head, Communication System Engineering Branch
Mr. D.I. Himes	Head, Transmission Technology Branch
Mr. W.D. Long*	Head, Integrated Warfare Technology Branch
Mr. S.H. Wilson	Head, Computer Science and Systems Branch

Personnel

Full-time civilian: 125

R&D Budget

FY 1985: $15,780,000

*Acting

Space Systems and Technology Division

Staff Activities

RF Systems
- Investigation for Advanced Satellite Programs
- Advanced and Experimental Communications Systems for Spacecraft and Earth Terminals
- Division Technology Briefings

Research Activity Areas

Electrical Systems and Spacecraft Integration
- Spacecraft Power and Ordnance Systems
- Aerospace Systems Fabrication
- Quality Assurance & Reliability
- Survivability Concepts

Terrestrial Systems
- Software for Collection Systems Control
- Advanced Satellite Ground Station Design
- Fleet-Deployed Satellite Systems

Mechanical Systems
- Spacecraft Structural Design
- Attitude and Thermal Control
- Launch Vehicle Integration
- Spacecraft Environmental Testing

Radio Frequency & Optical
- Advanced Space & Related Ground Communications Systems
- Radio Frequency Active Components & Antennae
- Communication Systems Study & Analysis
- Electromagnetic Spectrum Utilization
- Laser-Based Optical Communication Systems

Space Applications
- Navigation Systems
- Time Synchronization
- Hydrogen Masers
- Frequency Standard Development

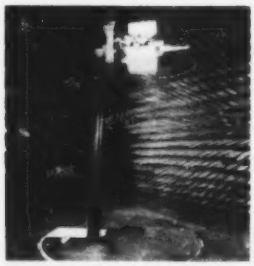
Space Sensing Applications
- Surveillance Sensor & Algorithm Development
- Electromagnetic Scatter Research
- Surveillance System Performance Requirements Definition

Systems Engineering & Analysis
- Payload Development
- Systems Integration & Tests
- Space Systems Technical Evaluation

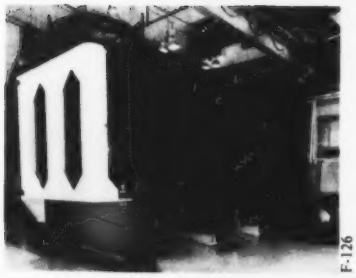
Digital Systems
- Spaceborne Signal and Data Processors Development
- Spacecraft Telemery, Command & Data Management
- Spacecraft Test Systems Design
- Astrodynamics Research and Application

F-124

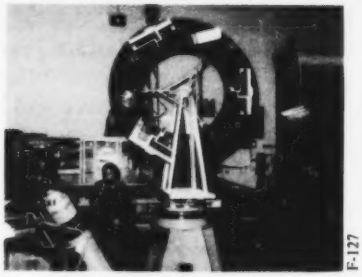
Computer Aided Design Facility


F-125

Electronic Equipment Testing in Anechoic Chamber


F-126

Thermal Vacuum Chamber


F-127

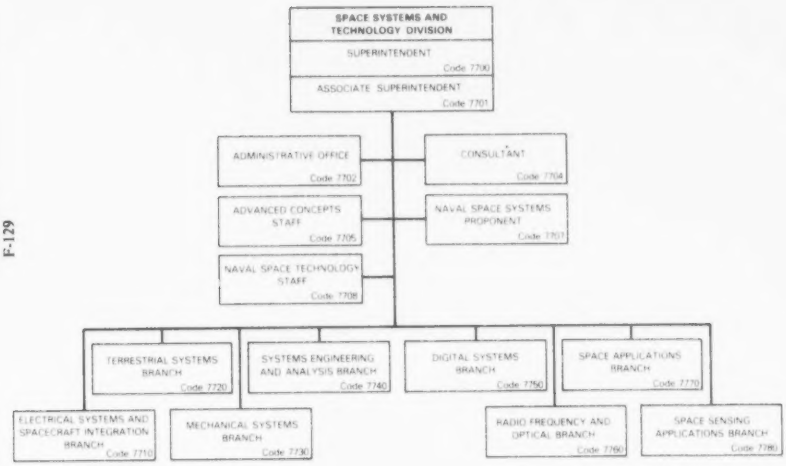
LIPS Satellite Development

F-128

Satellite Tracking Facility

Mr. P. G. Wilhelm

F-129



Basic Responsibilities

The Space Systems and Technology Division (SSTD) is the Navy's principal organization, or "lead laboratory," for space research. Activities extend from basic and applied research through advanced development in all areas of interest to the Navy space program. These activities include developing spacecraft, systems using these spacecraft, and ground command and control stations. Principal functions of the Division include understanding and clarifying requirements; recognizing and prosecuting promising research and development; analyzing and testing systems to quantify their capabilities; developing operational concepts that exploit new technical capabilities; system engineering to allocate design requirements to subsystems; and engineering development and initial operation to test and evaluate selected spacecraft subsystems and systems. The Division is a focal point and integrator for those divisions at NRL whose technologies are used in space systems. The SSTD is the core organization for the Naval Space Technology Center whose mission is to "preserve and enhance a strong space technology base and provide expert assistance in the development and acquisition of space systems which support naval missions." The Division also provides systems engineering and technical direction assistance to system acquisition managers of major space systems. In this role, technology transfer is a major goal and motivates a continuous search for new technologies and capabilities and the development of prototypes that demonstrate the integration of such technologies.

Key Personnel

Name	Title
Mr. P.G. Wilhelm	Superintendent
Mr. F.V. Hellrich	Associate Superintendent
Mrs. L.P. Wales	Administrative Officer
Mr. J.H. Trexler	Consultant
Mr. L.E. Hearton	Head, Advanced Concepts Staff
Dr. J.N. Hayes	Head, Navy Space Systems Proponent
Mr. P.G. Wilhelm*	Head, Navy Space Technology Center
Mr. J.G. Winkler	Head, Electrical Systems & Spacecraft Integration Branch
Mr. T.W. Fisher	Head, Terrestrial Systems Branch
Mr. R.T. Beal	Head, Mechanical Systems Branch
Mr. L.M. Hammarstrom	Head, Systems Engineering & Analysis Branch
Mr. R.E. Eisenhauer	Head, Digital Systems Branch
Mr. F.E. Betz	Head, Radio Frequency & Optical Branch
Mr. R.L. Beard	Head, Space Applications Branch
Dr. V.E. Noble	Head, Space Sensing Applications Branch

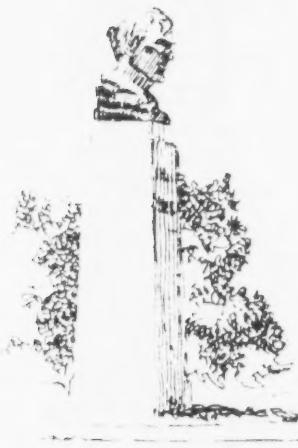
Personnel

Full-time civilian: 245

R&D Budget

FY 1985: $141,086,200

*Acting



Professional Development

PROFESSIONAL DEVELOPMENT

NRL has established many programs for the professional and personal development of its employees so they may better serve the needs of the Navy. These programs develop and retain talented people and keep them abreast of advanced technology and management skills. Graduate assistantships, fellowships, sabbatical study programs, cooperative education programs, individual college courses, and short courses for personal improvement contribute to professional development.

Programs also exist for non-NRL employees. These programs enhance Laboratory research efforts by providing means for non-NRL professionals to work at the Laboratory, thereby improving the interchange of ideas, meeting critical short-term technical requirements, and providing sources for new scientists and engineers. The programs include two-year graduate fellowships, faculty and professional interchanges, undergraduate work, and introducing gifted and talented high school students to the world of technology.

Programs for NRL Employees

During 1984, NRL employees participated in about 3500 individual training events. Many of these were presented as either video taped or on-site instructed courses on diverse, technical subjects, management techniques, and enhancement of personal skills (efficient use of time, memory improvement, interpersonal communications, speed reading, etc.).

One common study procedure is for employees to work full time at the Laboratory and take job-related scientific courses at universities and schools in the Washington area. The training ranges from individual courses to full graduate and postgraduate programs. Tuition for job-related training is paid by NRL. Descriptions of formal programs offered by NRL follow.

Graduate Programs

• The **Advanced Graduate Research Program** (formerly the Sabbatical Study Program) enables selected professional employees to devote full time to research or course work in their own or a related field for one academic year at an institution of their choice without the loss of regular salary, leave, or fringe benefits. NRL pays all education, travel, and moving expenses for the individual and dependents. The program is open to paraprofessional (and above) employees who have completed six years of federal service, including four years at NRL.

• The **Edison Memorial Graduate Training Program** enables employees to pursue advanced studies in their fields at local universities. Eligible employees who are selected for participation in this program normally spend 24 hours of every work week in their studies. The criteria for eligibility include a minimum of one year of service at NRL, a bachelor's or master's degree in an appropriate field, and professional standing in keeping with the candidate's opportunities and experience.

• To be eligible for the **Select Graduate Student Program**, employees must have a college degree in an appropriate field and must have maintained at least a B average in undergraduate study. Accepted students devote a full academic year to graduate study. While attending school, they receive one half of their salary, and NRL pays for tuition, books, and laboratory expenses. During the summer, they work at the Laboratory and receive normal pay and fringe benefits.

• Research conducted at NRL may be used as **thesis material for an advanced degree**. This

original research is supervised by a qualified employee of NRL who is approved by the graduate school. The candidate should have completed the required course work and should have satisfied the language, residence, and other requirements of the graduate school from which the degree is sought. NRL provides space, research facilities, and supervision but leaves decisions on academic policy to the cooperating schools.

• The **Alfred P. Sloan Fellows Program** is designed for competent young executives whose job performance indicates senior management potential. The Sloan Fellows spend one year with the Massachusetts Institute of Technology faculty and with policymakers in industry and government. They study the theory and practice of effective and responsible management in a rapidly changing society.

• The **Education for Public Management Program** serves the training needs of individuals who are at midcareer and who have the talent to assume increasing responsibilities to direct agency programs and policies.

• The **Education Program for Federal Officials** exists for a small group of Federal employees who have demonstrated high competence and unusual promise. The Woodrow Wilson School of Princeton University has developed this program to enable selected midcareer officials to enlarge their knowledge in particular disciplines, to relate their fields of specialization to the broader concerns of government, and to sharpen their capacity for objective analysis of governmental problems.

• Federal Executive fellowships are available each year for employees to study in the **Brookings Institute Advanced Study Program**. In this program, the fellow is exposed to and participates in planning, developing, and conducting educational conferences on public policy issues for leaders in public and private life.

• The **Fellowship in Congressional Operations for Executives** provides an opportunity for some of the most promising young, technically oriented Federal executives to participate in a variety of assignments designed to develop their knowledge and understanding of Congressional operations. These fellows share activities with other members of the Congressional Fellowship Program who come mainly from journalism, law, and college teaching.

• The **Maxwell Midcareer Development Program** of the Maxwell Graduate School of Citizenship and Public Affairs, Syracuse, New York, increases the managerial knowledge, ability, and skills of experienced Government officials who have been identified by their agencies as having potential for advancement to positions demanding progressively greater managerial and executive responsibilities.

• The **Practicing Engineer Advanced Study Program** of the M.I.T. Center for Advanced Engineering, Cambridge, Massachusetts, enables experienced engineers and applied scientists to work in-depth in technological areas pertinent to their professions, preparing for continued leadership in an age of unparalleled technological change.

• The **Science and Technology Fellowship Program**, a subsidiary of the Commerce Science Program, includes a variety of special events, lectures, seminars, visits, conferences, field trips, and interactions with key people from both the public and private sectors. Participants spend one week on Capitol Hill in an intensive, congressional orientation; they spend one week with the Brookings Institute, Science Policy Conference; and they take two week-long field trips for on-site inspection of scientific institutions and industrial complexes.

• The **Stanford-Sloan Program of the Graduate School of Business**, Stanford, California, gives exceptional young executives an opportunity to make an intensive study of new concepts and developments in business, to develop a top management perspective, and to broaden their intellectual horizons.

• The **Naval Postgraduate School** (NPS) in Monterey, California, provides advanced graduate study for selected Federal civilian employees who meet NPS academic requirements for the program in which they are interested, and whose employing agency is willing to act as sponsor.

Continuing Education

• Local colleges and universities offer **undergraduate courses** at NRL for employees to improve their skills and keep abreast of current developments in their fields. These courses are also available at many other DoD installations in the Washington, D.C. area.

• The Employee Development Branch at NRL offers to all employees **short courses** in certain program areas which are not available at local schools; laboratory employees may attend these courses at nongovernment facilities as well. Interagency courses in management, personnel, finance, supervisory development, clerical skills, and other areas are also available.

For further information on any of the above programs, contact the Employee Development Branch at (202) 767-2956.

Growth Opportunities

NRL has several programs, professional society chapters, and informal clubs that enhance the professional growth of employees. Some of these are listed below.

• The **Career Counseling Center** helps employees to define short- and long-range career goals, to improve their job-seeking skills, and to deal with issues affecting job productivity.

• A chartered chapter of **Women in Science and Engineering** (WISE) has been established at NRL. Informal monthly luncheons and seminars are held to inform scientists and engineers of women's research at NRL and to provide an informal environment for practicing their presentations.

• **Sigma Xi**, the Scientific Research Society, encourages original investigation in pure and applied science. The NRL chapter of approximately 450 active members meets nine times each year (from October to June) and sponsors a series of lectures on a wide range of pure and applied scientific topics of interest to both scientific and government communities. Each spring it sponsors an Edison Memorial Lecture at which a distinguished scientist, usually a Nobel Laureate, speaks on his or her research. The chapter also presents annual awards in pure and applied science.

• Any employee who is interested in developing effective self expression, listening, thinking, and leadership potential can join either of the two NRL chapters of **Toastmasters International**. Members of these clubs, who possess diverse career backgrounds and talents, meet three times a month to learn to communicate not by rules but by doing in an atmosphere of understanding and helpful fellowship.

• The **Federal Executive Professional Association** (FEPA) provides testimony, recommendations, and constructive criticism of the policies of the Executive Branch on existing proposed legislation and on regulatory actions. It also assists various advisory boards and commissions concerned with professional employee relations and benefits. The FEPA meets monthly for seminars given by NRL management.

Other programs that enhance the development of NRL employees include computer clubs (Edison, Atari, Edison Commodore, and the NRL-IBM PC) and the Amateur Radio Club. The Recreation Club offers many facilities to promote physical fitness. The Showboaters, a nonprofit drama group, presents live theater for the enjoyment of NRL and the community and produces two major productions each year, in addition to occasional performances at Laboratory functions and benefits for local charities.

Programs for Non-NRL Employees

Programs also exist for non-NRL employees. These programs encourage and support the participation of visiting scientists and engineers in research of interest to the Laboratory. Some of the programs may serve as stepping stones to federal careers in science and technology. Their objective is to enhance the quality of Laboratory research activities through working associations and interchanges with highly capable scientists and engineers and to provide opportunities for outside scientists and engineers to work in the Navy laboratory environment. Along with enhancing NRL research, these programs acquaint participants with Navy capabilities and concerns.

Recent Ph.D., Faculty Member, and College Graduate Programs

• The **National Research Council (NRC)/NRL Cooperative Research Associateship Program** selects associates who conduct research at NRL in their chosen fields in collaboration with NRL scientists and engineers. The tenure period is two years, and following their tenure, the Office of Naval Research offers the associate posttenure research grants tenable at an academic institution.

• The American Society for Engineering Education (ASEE) administers the **Office of Naval Technology (ONT) Postdoctoral Fellowship Program** to increase the involvement of highly trained scientists and engineers in disciplines to meet the evolving needs of naval technology. Appointments are for one year (renewable for a second and sometimes a third year). The appointments are competitive and are made jointly by ONT and ASEE.

• The American Society for Engineering Education also administers the Navy/ASEE **Summer Faculty Research Program** for university faculty members to work for 10 weeks with professional peers in participating Navy laboratories on research of mutual interest. NRL hosted 29 of these faculty participants in 1984.

• The **NRL/United States Naval Academy (USNA) Cooperative Program for Scientific Interchange** allows faculty members of the U.S. Naval Academy to participate in NRL research. This collaboration benefits the Academy by providing the opportunity for USNA faculty members to work on research of a more practical or applied nature. In turn, NRL's research program is strengthened by the available scientific and engineering expertise of the USNA faculty.

• The **Office of Naval Research Graduate Fellowship Program** helps U.S. citizens obtain advanced training in disciplines of science and engineering critical to the U.S. Navy. The three-year program awards fellowships to recent outstanding graduates to support their study and research. This research must lead to doctoral degrees in specified disciplines such as electrical engineering, computer sciences, material sciences, applied physics, and ocean engineering. Award recipients are encouraged to continue their study and research in a Navy laboratory during the summer. Since the summer option began in 1983, 12 ONR graduate fellows have chosen NRL for their summer work.

• The **United States Naval Academy Ensign Program** assigns Naval Academy graduates to NRL to work in areas of their own choosing and commensurate with their academic qualifications. These graduates provide invaluable summer research assistance while gaining experience in Navy R&D programs.

Professional Appointments

• **Faculty Member Appointments** use the special skills and abilities of university faculty members for short periods to fill scientific, engineering, professional, or analytical positions.

• **Consultants and experts** are employed because they are outstanding in their specialized

fields or because they possess rare abilities but cannot normally be employed as regular full-time civil servants.

• **Intergovernmental Personnel Act Appointments** temporarily assign personnel from state or local governments or educational institutions to the Federal Government (or vice versa) to improve public services rendered by all levels of government.

Undergraduate College Student Programs

Several programs are tailored to the undergraduate which provide employment and work experience in naval research. These are designed to attract applicants for professional employment in the Laboratory's shortage category positions such as engineers, physicists, mathematicians, and computer scientists. The student employment programs foster an understanding of NRL job opportunities among students and educational personnel so that educators can provide students who will meet NRL's occupational needs. The employment programs for college students include:

• The **Cooperative Education Program** alternates periods of work and study for students pursuing bachelor degrees in engineering, computer science, or the physical sciences. Several universities participate in this program.

• The **Federal Junior Fellowship Program** hires students entering college to be assistants to scientific, professional, or technical employees.

• The **Summer Employment Program** employs students for the summer in paraprofessional and technician positions in engineering, physical sciences, and computer sciences.

• The **Student Volunteer Program** helps students gain valuable experience by allowing them to voluntarily perform educationally related work at NRL.

• The **1040-Hour Appointment** employs students on a halftime basis to assist in scientific work which is related to their academic program.

High School Programs

• The **Gifted and Talented Internship Program** provides a meaningful, part-time employment experience for high school graduates who plan to pursue a bachelor's degree in engineering, computer science, or the physical sciences.

• The **Summer Research Apprentice Program** employs high school juniors and seniors to serve for eight weeks as junior research associates. Under the direction of a mentor, students gain a better understanding of research, its opportunities, and challenges through participation in scientific programs. Criteria for eligibility are based on science and mathematics courses completed and grades achieved; scientific motivation, curiosity, and capacity for sustained hard work; a desire for a technical career; teacher recommendations; and ability and achievement test scores.

For additional information on professional opportunities or college or high school student programs, please contact the Personnel Operations Branch at (202) 767-3030 or the Employee Development Branch at (202) 767-2956.

Awards Received by Civilian Employees in FY 1984

Government	Number
Meritorious Executive Award, Senior Executive Service	1
Senior Executive Bonus Award	5
E.O. Hulburt Annual Science Award (local NRL Award)	1
Navy Meritorious Civilian Service Award	3
Navy Superior Civilian Service Award	1
NRL Award for Achievement in the Field of Equal Opportunity	1
Nongovernment	
American Crystallographic Association, 1984 A.L. Patterson Award	1
American Institute of Chemists, Pioneer in Chemistry Award	1
Electrochemical Society, William Blum Award	1
Federal Laboratory Consortium, 1984 Special Award for Excellence	2
IEEE Centennial Medal Award	2
Sigma Xi, The Scientific Research Society, Applied Science Award	1
Sigma Xi, The Scientific Research Society, Pure Science Award	1

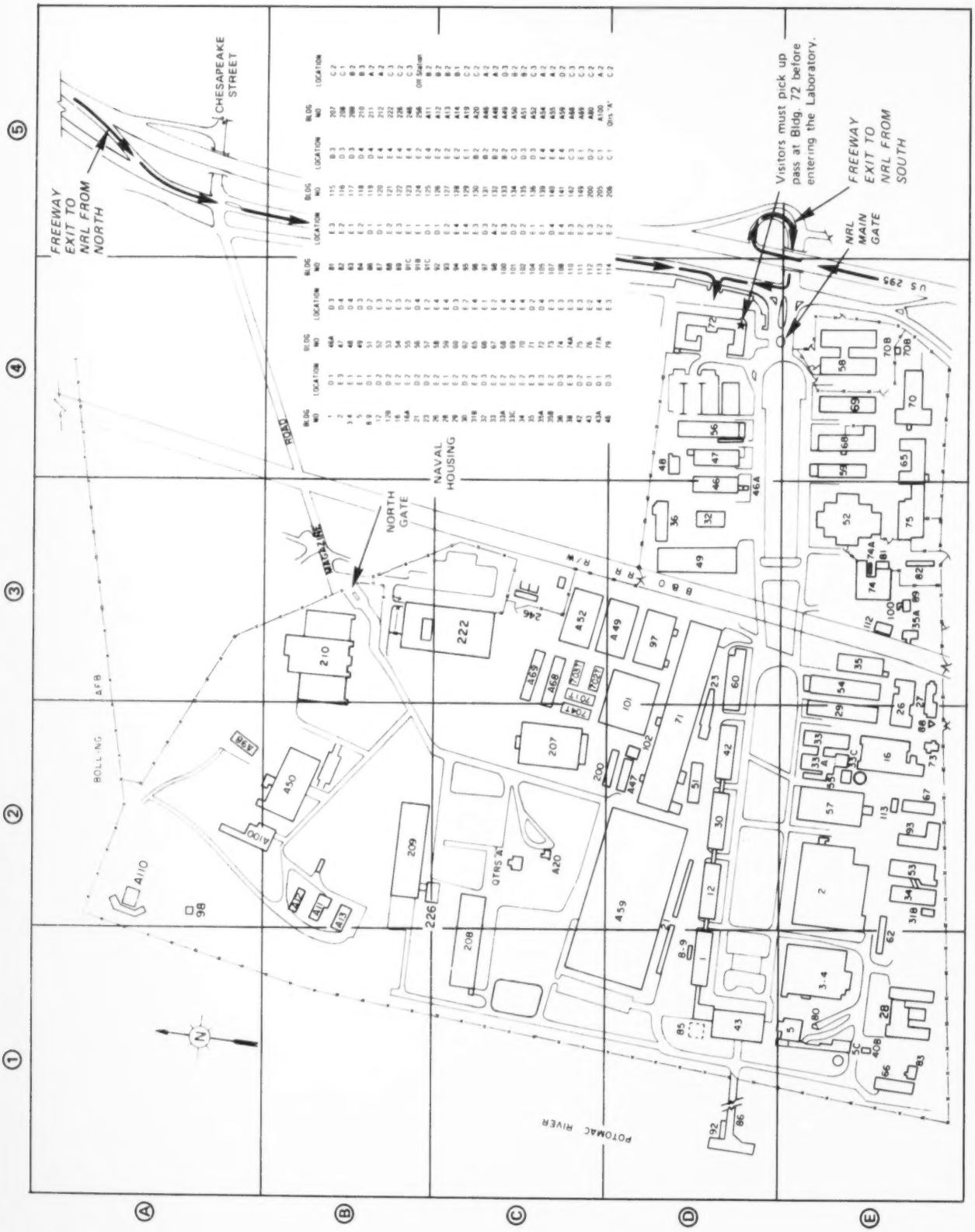
General Information

General Information

LOCATION OF NRL IN THE CAPITAL AREA

12/82

Location of Buildings at Main Site



Location of Principal Field Stations

Approximate driving distance from NRL (in miles)

A — Blossom Pt., MD	40	E — Patuxent River Naval Station	64
B — Brandywine, MD	23	F — Pomonkey, MD	25
C — CBD (Chesapeake Bay Detachment)	40	G — Tilghman Island	110
D — Maryland Point Observatory	45	H — Waldorf Radio Site, MD	20

The Underwater Sound Reference Detachment is located at Orlando, FL.

KEY PERSONNEL

Code			Ext.
	EXECUTIVE DIRECTORATE		
1000	Commanding Officer	CAPT J.P. O'Donovan, USN	73403
1001	Director of Research	Dr. T. Coffey	73301
1003	DEEO Officer	Ms. S.A. Eaton	72486
1004	Scientific Consultant to the Dir. of Res.	Dr. A.H. Aitken	73724
1005	Head, Office of Mgmt. and Admin.	Mrs. M. Oliver	73086
2610	Public Affairs Officer	Mr. J.W. Gately, Jr.	72541
1200	Chief Staff Officer	CAPT J.B. Morris, USN	73621
1220	Head, Security Branch	Mr. M.B. Ferguson	73048
1300	Comptroller	Mr. R.W. Steinbeck	73405
1800	Head, Civ. Pers. Div.	Mr. D.J. Blome	73421
1810	Personnel Operations	Mr. D.J. Blome	73421
	TECHNICAL SERVICES DIRECTORATE		
2000	Assoc. Dir. Res. for Tech. Services	Mr. J.D. Brown	72879
2004	Patent Counsel	Dr. W.T. Ellis	73428
2010	Safety Officer	Mr. H.C. Kennedy, Jr.	72249
2020	Head, Administrative Services Office	Mrs. L.V. Dabney	73858
2300	Engineering Services Officer	LCDR M.L. Crouch, USN	72300
2400	Supply Officer	LCDR T. Lippert, USN	73446
2500	Public Works Officer	CDR J.P. Collins, USN	73371
2600	Head, Tech. Info. Div.	Mr. E.E. Kirkbride	73388
2700	Chesapeake Bay Detachment Officer (Tel. No. is Area Code 301-257-4002)	CDR R.S. Holtz, USN	
2800	Head, Research Computation Division	Mr. R. Saenger	72751
	GENERAL SCIENCE AND TECHNOLOGY DIRECTORATE		
4000	Assoc. Dir. Res. for General Sci. & Tech.	Dr. W.R. Ellis	73324
4040	Head, Lab. for Computational Physics	Dr. J.P. Boris	73055
4100	Space Science Div. Supt.	Dr. H. Gursky	76343
4700	Plasma Physics Div. Supt.	Dr. S. Ossakow	72723
	SYSTEMS RESEARCH AND TECHNOLOGY DIRECTORATE		
5000	Assoc. Dir. Res. for Systems Res. & Tech.	Mr. R.R. Rojas	73294
5100	Acoustics Div. Supt.	Mr. B. Hurdle	73482
5300	Radar Div. Supt.	Dr. M.I. Skolnik	72936
5700	Tactical Elec. Warfare Div. Supt.	Dr. G.P. Ohman	76278
5800	Marine Technology Div. Supt.	Dr. R.T. Swim	73314
5900	Underwater Sound Reference Det. Supt. (Tel. No. is Area Code 305-859-5120)	Dr. J.E. Blue	
	MATERIAL SCIENCE AND COMPONENT TECHNOLOGY DIRECTORATE		
6000	Assoc. Dir. Res. for Material Science & Component Tech.	Dr. A.I. Schindler	73566
6030	Head, Lab. for Structure of Matter	Dr. J. Karle	72665
6070	Head, Health Physics Staff	Mr. J.N. Stone	72232
6100	Chemistry Div. Supt.	Dr. W.M. Tolles	73026
6300	Mat. Sci. & Tech. Div. Supt.	Dr. B.B. Rath	72926
6500	Optical Sciences Div. Supt.	Dr. T.G. Giallorenzi	73171
6600	Condensed Matter & Radiation Sciences Div. Supt.	Dr. J.B. Aviles	72931
6800	Electronics Tech. Div. Supt.	Dr. G.M. Borsuk	73525
	SPACE AND COMMUNICATIONS TECHNOLOGY DIRECTORATE		
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7500	Information Technology Div. Supt.	Dr. J.R. Davis	72903
7700	Space Systems and Technology Div. Supt.	Mr. P.G. Wilhelm	76547

MISCELLANEOUS

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IDS, Incoming 19-(Ext.)		
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Medical Clinic		73592

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INTRODUCTION TO THE NAVAL RESEARCH LABORATORY 1

EXECUTIVE DIRECTORATE 19

TECHNICAL SERVICES DIRECTORATE 37

GENERAL SCIENCE AND TECHNOLOGY DIRECTORATE 55

SYSTEMS RESEARCH AND TECHNOLOGY DIRECTORATE 65

MATERIAL SCIENCE AND COMPONENT TECHNOLOGY DIRECTORATE 81

SPACE AND COMMUNICATIONS TECHNOLOGY DIRECTORATE 99

PROFESSIONAL DEVELOPMENT 109

GENERAL INFORMATION 117